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The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXV: No. 17.

New York, Thursday, April 22, 1880.

\$4.50 a Year, Including Postage.
Single Copies, Ten Cents.

The New Whitwell Hot Blast Stove.

In its earlier forms the Whitwell stove is well known to the readers of *The Iron Age*, and while it still retains all the leading features of the earlier type, as elaborated by the late Thomas Whitwell, long experience in its use under widely varying circumstances, both in this country and abroad, has led to an elaboration and alteration of detail, embodied in the accompanying illustrations, for which we are indebted to Messrs. Witherow & Gordon, engineers of Pittsburgh, the agents of the Whitwell stoves in this country. It was sought by recent modifications to reduce the cost of erection, to simplify the operation of cleaning the walls and render the latter more efficient by the adoption of an apparatus in which handwork is aided by mechanical contrivances, and finally, to correct earlier imperfections in the proportion of the parts.

In accordance with Mr. Whitwell's patents of 1876, the height has been increased from 28 feet 6 inches to 70 feet, if desired. By this means the capacity of the stoves is more than doubled, while the increase in cost is but slight, and is due to an increase in the quantity of crude materials only, since the expensive parts, embracing the valves, cleaning doors, &c., are the same for any height. Combined with this, another improvement consists in the subdivision of the former 9-inch into 4½ inch partition walls, and more than doubling the number of cross or stay walls, thus considerably increasing the heating surface. The older type of stove, 22 feet diameter, was divided into ten chambers by nine 9-inch partition walls. The burning gases, and in a reverse direction the blast, traversed vertically each of these chambers, being forced to pass over the first wall, under the second, and so on from their entrance to their exit from the stove. In the new type there are but three heavy division walls, dividing the stove into four chambers, each of which, except the first or combustion chamber, is subdivided by three or four parallel 4½-inch walls and by from seven to twelve cross or stay walls, also 4½ inches thick. The gases enter the combustion chamber through the gas valve, as shown by the full drawn arrows in Fig. 1, encounter hot currents of air, and intense combustion ensues; ascending, the hot and partially burnt gases mount over the first main division wall and descend the passages in the second chamber; turning under arches in the middle wall, they rise through like passages in the third chamber; again mingling and reversing, they pass over the third wall, and, having imparted all their heat to the network of bricks, fall through the passages of the fourth chamber and pass the chimney valve at a temperature barely sufficient to produce an economic natural draft. The air with which they are burned is first heated to a high temperature by traversing passages in the outer brickwork of the stove itself. There is no complication in this arrangement, which is clearly shown in Fig. 3. Mere channels are left in the brickwork, through which the air flows, by draft, to the combustion chamber, where it is admitted through a number of openings spaced around the walls. Experience has taught that with such large volumes of gas it is utterly impossible to attain complete combustion at one operation. Hence, at each turn of the gases they are again met by diminishing volumes of heated air issuing from passages at the top of the partition walls, as shown in Fig. 1. The volume of air passing through them is under control by separate valves.

To utilize the heat now absorbed by the mass of from 100,000 to 225,000 bricks, according to the size of the stove, the gas valve, chimney valve and the air ports are closed, and the cold and hot-blast valves are opened. The cold air entering the stove traverses it in a direction opposite to that taken by the heating gases, as shown by the dotted arrows in Fig. 1. Absorbing heat from the glowing brickwork of the stove, it passes from out the combustion chamber to the furnace at a temperature of about 180° F.

One great point in the new type of the Whitwell stove is the reduction of the number of reverse turns from nine to three, the gas and blast traversing the full length or height but four times instead of ten. While the heating area is more than doubled by numerous subdivisions, yet, owing to the increase in height from 28½ feet to 60 or 70, the length of passage remains the same—about 210 feet. The three reverse turns, with the chambers at the top and bottom of the main walls, are of practical utility, by affording the means of admitting fresh supplies of air to complete combustion by inducing a thorough mixture of the gases and more even distribution of heat, by serving as depositories for the heavier ash and impurities carried in from the furnace, and by aiding in the all-important matter of cleanliness. Experience has also taught that there is a reasonable limit to the aggregate area through which a volume of gas can be made to pass. This area, composed of a number of small passages, is made proportional to the amount of air to be heated by a given sized stove. If the passages are too large or too numerous, the hot gases will flow only through a part of them, leaving the balance unaffected or but slightly heated. The air, passing in a reverse direction, will then seek the cooler portions, as highly heated passages always present a greater resistance than cooler ones. Therefore, heating surface may or may not be the

measure of the utility of such an apparatus; but certainly it is not the only point for consideration. Did experience so teach, the passages would be made smaller than they now are, and the brick walls thinner. The old type of stove undoubtedly was a very expensive one per foot of surface, yet against that objection its great and good qualities pushed it into most prominent use.

Recognizing, however, that the arrangement of brickwork in the old type had too little surface for the material in it, the builders have more than doubled the heating surface, and yet have not run into the opposite

The high velocity of the blast is instrumental in performing another office of the greatest importance. The flocculent material carried in by the gases from a furnace is, in consequence of the rapid flow of the air, removed to a great extent, being blown from the walls and deposited in the large chambers at the bottom, from which it can be taken through the doors placed for that purpose.

The utmost importance must be attached to this question of cleanliness in the passages. The light, fleecy deposit, if allowed to increase to any great extent, will not only

through cleaning doors above and below. Through the upper doors is operated a weighted scraper, which can be run up and down with great rapidity. The lower doors being then removed, all the dust can be withdrawn.

The power of these stoves to sustain an even temperature is shown by the working of the new plant of three 18 x 60 foot stoves at McCormick & Co.'s Paxton Iron Works, Harrisburg, Pa. In a blow of two hours the temperature of blast from these stoves varied only 10 degrees, and the reserve of heat is illustrated by the fact that one stove

along at a product of 60 tons per day. Mr. Doud himself, as constructing engineer, is now negotiating for a plant of two new furnaces, to be built on the Tennessee Railroad by ironmasters of Nashville.

The high estimation in which the Whitwell Hot Blast Stove is held, is illustrated by the fact that 500 are in use in Europe and America, of which this country possesses 94. A few notes on what is being done among the furnaces will be of interest to many.

The Dunbar Furnace Company, of Fayette County, Pa., A. B. DeSauvages vice-president and general manager, have four Whitwell stoves 40 feet in height with an aggregate heating surface of 34,000 square feet. This furnace is working upon lean, highly siliceous ores obtained upon its own property. To produce from them a No. 1 foundry iron such as is made, the enormous percentage of from 75 to 90 of lime is required. The amount of air used in their make of about 500 tons weekly, ranges from 10,000 to 20,000 cubic feet per minute, and yet the above small heating surface is capable of supplying this immense volume reliably with a temperature of 1400° F. These stoves, though under the severe duty above stated, have not cost \$100 since their erection in 1876. Mr. De Sauvages has ordered the new type of stoves, 18 x 60 feet, for his new No. 2 furnace.

The Isabella Furnace Company, John Chalfant, managing director, of Pittsburgh, is building a plant of three 21 x 60 foot stoves, each of which will have 25,000 square feet of heating surface and will contain 210,000 fire-brick. The New North Chicago Steel Company, O. W. Potter, president, have contracted and are about commencing, under the management of Mr. J. H. Creamer, the erection of fourteen stoves, like those for the Isabella, for the support of four new blast furnaces, 21 feet bosh by 75 feet high. Each furnace will have over 15,000 cubic feet of contents, and into each will be driven 2,000 cubic feet of air per minute, at a constant temperature of 1500° F. This will be the greatest furnace plant on the American Continent. The Union Rolling Mill Company, of Chicago, A. B. Stone, president, is now building, under the supervision of Mr. E. Metzler, a plant of two new furnaces, 16 x 74 feet, to be supported by six Whitwell stoves, 17 x 60 feet, of the new type, while three Whitwell stoves, 17 x 60 feet, are building for the Neshannock Iron Company, W. E. Reis, general manager, of New Castle, Pa. The Kimberley Iron Company, of Sharon, Pa., have agreed to commence a similar plant within 60 days. M. Ayers, of Chicago, president of Brown, Bonnell & Co., is now negotiating for two new plants. Messrs. Witherow & Gordon have also contracted with Robert H. Coleman, of Cornwall, Pa., for the first plant for his new Colebrook Furnace, now under construction at Lebanon, Pa. Chas. B. Forney, general manager. This plant will consist of two furnaces, 16 x 55 feet, and will be supported by six Whitwell 18 x 55-foot stoves. They are negotiating with Mr. Samuel Thomas, of Catawissa and Hokendauqua, for his first Whitwell plant, the first of a series for the many furnaces with which this prominent ironmaster is identified. The Crane Iron Works are rebuilding two more of their original plant, and erecting two sets of Whitwell's, 18 x 60 feet, new type, they having had in operation one small plant of the old type, 18 x 40 feet, since 1876.

Four stoves, 18 x 60 feet, now being built by the Cambria Iron Company, Johnstown, Pa., will soon be in operation, supporting their new No. 2 Centennial furnace, 20 x 75 feet, also about completed. The new furnace, 18 x 70 feet, of Mr. Robert Hare Powell, of Philadelphia, now nearly completed, in the Broadtop district, at Saxton, Bedford County, Pa., has three Whitwell 18 x 70-foot stoves of modern type, and the Lowmoor Iron Company, of Virginia, have also their new furnace, 18 x 75 feet, and Whitwell plant, 18 x 60 feet, nearly completed. The Southern States Iron and Coal and Land Company, of Tennessee, of which the late Thomas Whitwell was founder, propose erecting the new type of stoves to their No. 2 furnace, now under way. Negotiations are also pending with Mr. Filley, president of the Missouri Furnace Company, St. Louis, for a plant of three Whitwell's, 17 x 60 feet, new type, to be attached to one of their furnaces now being remodeled. This company is the lessor of the Meier Iron Works, Illinois, near St. Louis, a fine plant of two 17 x 65-foot furnaces, built in 1874 and 1875, under direction of a German engineer, and having each four Whitwell's, 22 x 28½ feet, old type.

Messrs. Witherow & Gordon have just closed with the new furnace, 16 x 70 feet, now being built at Chester, Pa., by a company with which Mr. J. Roach, the shipbuilder, Mr. S. Felton, President of the Pennsylvania Steel Co., and the Messrs. Houston are prominently connected. This furnace will be supported by three Whitwell 18 x 60-foot stoves, as illustrated. It will be seen, therefore, that the use of fire-brick stoves is very rapidly extending, and that a modern furnace plant is hardly considered a complete one, or one capable of competing with others in point of economy of production, unless provided with approved and reliable apparatus for generating high temperatures of blast.

The Railroad system of the German Empire was extended by 1102 miles during the year 1879, of which 793 were built by the State.

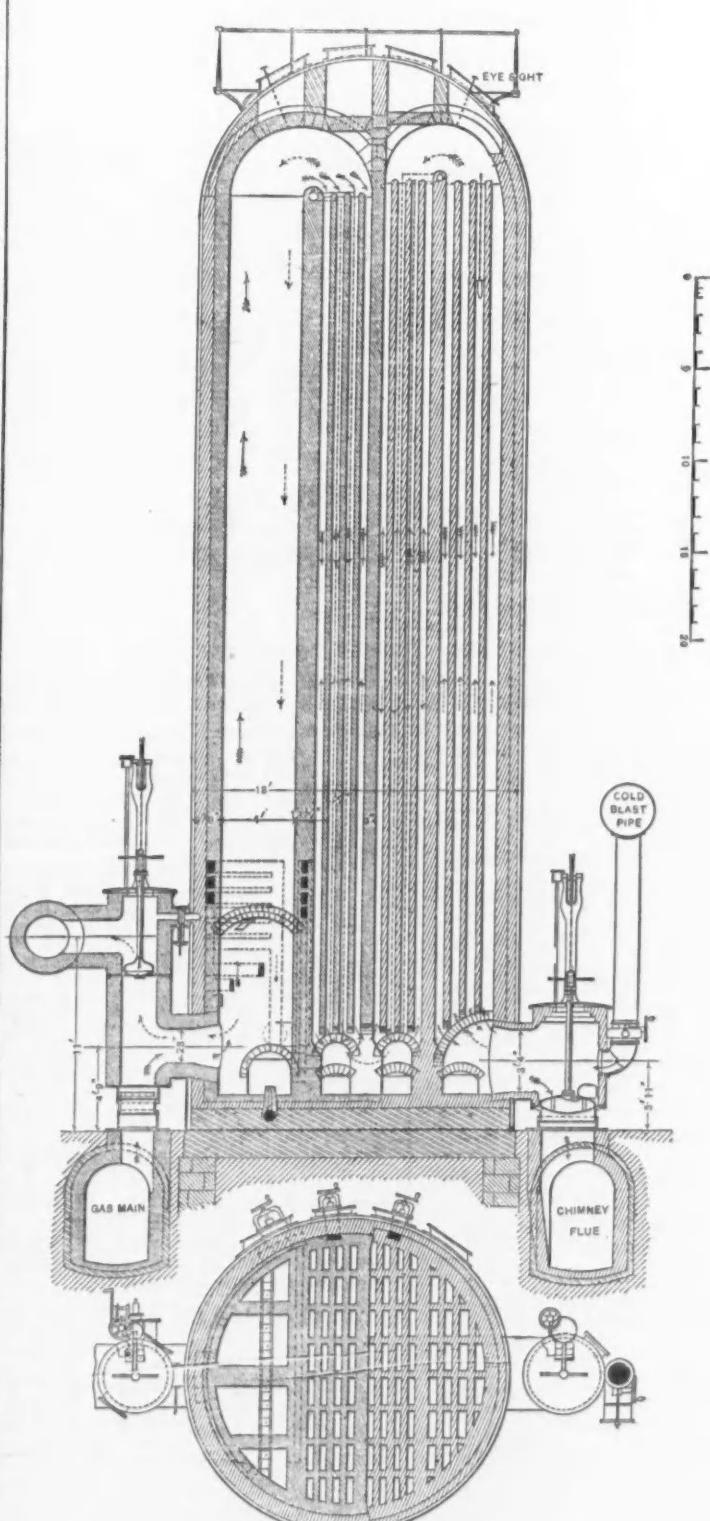


Fig. 1.—Sectional Elevation and Sectional Plan.

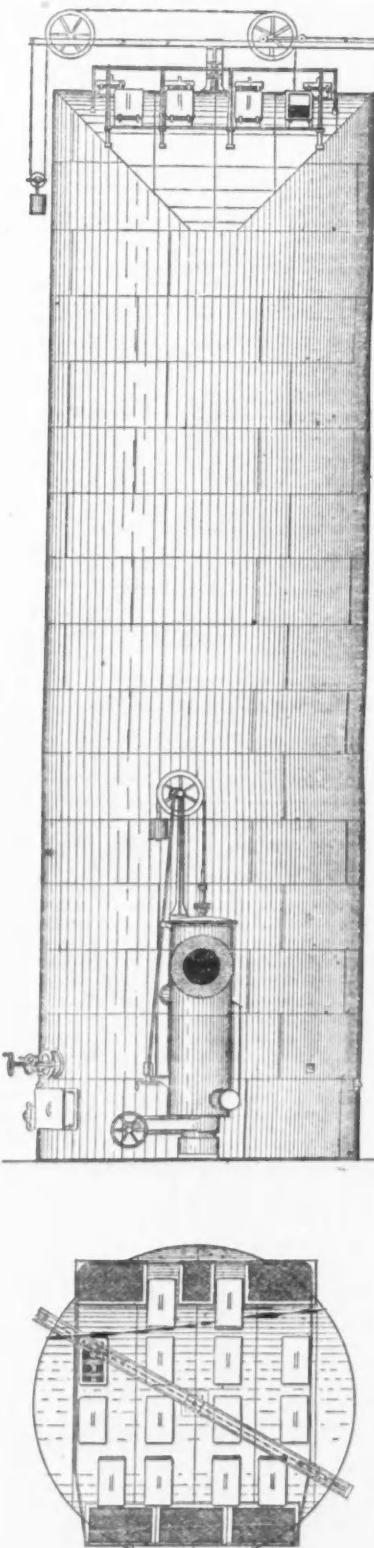


Fig. 2.—Elevation of Hot Side and Plan of Top.

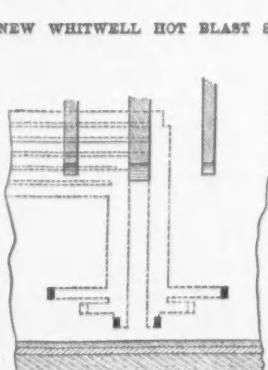


Fig. 3.—Air Ports and Flues in Combustion Chamber Wall.

extreme of cutting down the size of the openings and walls to an objectionable point. The walls are not too light to retain a volume of heat, nor are the openings too small to be cleaned or too numerous to be thoroughly utilized by the heated gases.

As before explained, and as shown in the drawing, the new type of stove is divided into four great chambers, which the gases traverse vertically and alternately, discharging into the flue at a temperature of about 400° F. The velocity of the gases passing through the stove is estimated to be 264 to 343 feet per minute, while the blast, passing first into the cooler side of the stove, has a velocity of about 1320 feet a minute. Becoming gradually heated, it expands and passes over every portion of the surface of the fire-brick, thus equally utilizing the entire heating surface of the structure. It may be presumed that, with the velocity stated, each particle of air would be too short a time within the stove to receive a full benefit from its heat. But when it is considered that the volume of air at any time within the stove is equal to that of any other construction, and that, though going faster, it goes proportionately further, it will be seen that this objection has no weight.

partially clog them, but, being a very poor conductor, will prevent the brickwork from properly absorbing and communicating heat. The inevitable result would be a flash of heat to the blast when first turned on and then a rapidly subsiding temperature. The sub-divided passages are now made about 5 x 18 inches in section. These can be readily scraped from top to bottom,

was kept on blast steadily for 10 hours with only a loss of 30 degrees. In January last, this company was compelled to stop their furnace for repairs to boilers. The stoves were closed at a temperature of 1400 degrees, and after standing more than two weeks, when started gave a temperature of nearly 900 degrees. This heat being so unexpected, and the furnace not being prepared to receive it, the blast was kept on the first stove for over eight hours and the temperature did not fall to 800 degrees. Mr. Edward Doud, of Chattanooga, Tenn., informs us of an experience at the Rising Fawn Furnace, Ga., which was working strong, on a very heavy burden, when the lower head of the steam cylinder gave way. This head had stands or legs by means of which the cylinder was held, and therefore it was absolutely necessary to have a strong new head. During the delay of at least 25 days the furnace stood banked up. Prior to the engine repairs being completed, the furnace manager had the combustion chamber cleaning doors removed and fired his hot blast with fuel, and obtained, when starting his engine, heat enough to make his blow pipes red hot. We may mention in this connection that this furnace, with 30 per cent.

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The Proper Dimensions of Boiler
Braces.

We had occasion to state, some time
since, in calling attention to some valuable
experiments made at the direction of the
Bureau of Steam Engineering, Navy Department,
by Messrs. James P. Sprague, Chief
Engineer, U. S. N., and George E. Tower,
Passed Assistant Engineer, that we would
at some future time give the results obtained.
The object of these experiments was, it will be remembered, to ascertain the
proper proportions of boiler braces. The
fact that the experiments teach lessons of

area 0.63 square inch. As the tensile
strength of the bars was 45,267 pounds per
square inch, the calculated strength of the
shank of the brace was 28,518 pounds. The
first brace, one-fourth of which was imperfect,
as soon as 28,780 pounds were reached, the
specimen elongating 0.625 inch. The second
failed in a different way, breaking through
the upper part of the eye, after resisting
26,450 pounds and showing an elongation of
0.9375 inch. A bad weld one-third of which
was imperfect, brought the third to grief
when it had been strained only 19,520
pounds and had been stretched 0.25 inches.

A careful examination of these tests shows
the uncertainty attending the use of boiler
braces made in this manner: first, owing to
the fact that it is impossible to know when
the weld is perfect, for notwithstanding
every precaution had been taken to secure
this result, 25 per cent. of these broke
in the weld. Of the two specimens marked
in Fig. 1, which parted in the weld, one
gave out at 9260 pounds less than the other,
although the workmanship was as nearly
the same in all as it was possible to make it,
and the material from the same bar; besides,
after being welded, the surfaces were planed
and finished, and during as well as after
each process they were carefully examined
without the discovery of any apparent de-
fects in the welding.

There was also much irregularity in the
breaking strength of the eyes made from the
same bar, and which broke in the side of the
eye, the weld being perfect, the difference
between the highest and lowest in some
trials being 4760 pounds, although made as
nearly in the same manner as it was possible,
and breaking in the same part of the eye.
In other tests, under the same circumstances,
the difference was 1450 pounds, and in



Fig. 1.

far wider application, and give sufficiently
accurate and practical information on a subject
which has never been carefully investigated,
renders the tests of more general value than they might at first be thought to possess.

As the proportions of the crown and the
sides of the eye were first sought after, no
care was taken to proportion the shank until
these had been closely approximated, it being
an easy matter to calculate what the
dimensions of the bar should be when the

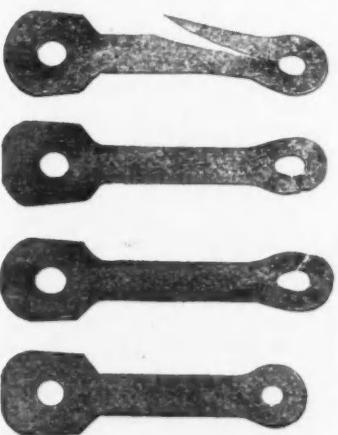


Fig. 2.

another trial, one specimen broke through
the side of the eye at 2330 pounds less than
the weld gave out in another. It would
seem that the high heat to which the iron
had to be brought in order to weld it, and
the subsequent working, had somewhat im-
paired the quality of the iron.

The specimens shown in Fig. 2 were pre-
pared from deductions derived from the
other tests, with the intention of having uni-
form strength in all parts. One of the braces
again broke through the weld and cracked
on the sides of the hole. It stood a strain of
27,200 pounds and stretched 0.65 inch, while
the calculated strength of the shank of brace
was like that of the two following ones,
29,067 pounds. The other two were the only
ones in the lot in which the bar showed signs
of giving way. They both broke through
the sides of the eye, but not until the strain
upon them had reached 27,155, and 29,585
pounds respectively, and they had elongated
0.75 and 0.52 inch. In these specimens the
depth of the course of the eye was 0.6875
inch and the breadth of one side of the eye
0.594 inch. If the sides of the eye had been
concentric with the crown, there can be no
doubt that, with the exception of the one
which gave out in the weld, the shank would
have yielded first, or would have been at the
point of yielding at the same time as the
eye. Messrs. Sprague and Tower have from
their experiments submitted the proportions
given in Fig. 3 as those which will give
nearly a uniform strength in the eye, slightly
in excess of that of the shank, supposing
the weld to be perfect and the quality of the
iron not to be materially affected in welding

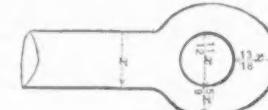


Fig. 5.

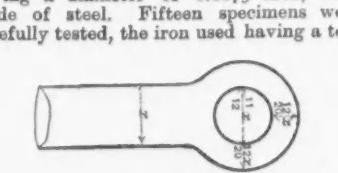


Fig. 3.

strength developed by the eye was known,
after three specimens were made in accord-
ance therewith and tested for verifying the
deductions. The first series of experiments
were made with eyes formed by drawing out
a 2 1/2 by 1/8 inch flat bar under the hammer,
bending and welding it around a mandrel
slightly smaller than the pin, then reaming
out the whole to fit; the rest was finished
to size in a shaping machine. The pins,
having a diameter of 0.6875 inch, were
made of steel. Fifteen specimens were
carefully tested, the iron used having a ten-

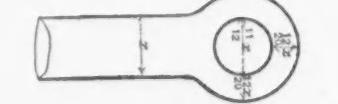


Fig. 4.

sile strength varying from 45,267 to 48,478
pounds, so that the calculated strength of
the shank of the brace varied from 28,518
to 30,541 pounds. In the majority of cases
the brace broke across the eye; in many in-
stances the weld broke, and only in two
cases did the bar itself show signs of giving
way. The accompanying illustrations, Fig.
1, show characteristically the way in which
the braces failed. They all, it should be re-
membered, represent braces made by bend-
ing over the bar and welding it to form the
eye. Some of the fractures clearly show



Fig. 6.

and working. They add that these propor-
tions will apply until the thickness of the
bar is equal to the breadth, and that with a
steel pin of proper tensile strength, its dia-
meter can be reduced to 0.65 of the breadth
of the bar with the same results.

A series of experiments were then made
upon eyes cut from the flat bar without
forging. In order to show the nature of
the fracture by a characteristic example,
we have appended Fig. 4. The dimensions
of the eye of the brace were: Outside diam-
eter, 1.9375 inch; thickness, 0.503 inch;
depth from crown to hole, 0.625 inch; sec-
tional area at sides of hole, 0.0287; and sec-
tional area at crown, 0.3144 inch. The
principal measurements of the shank of the
brace were: Breadth, 1.254 inch; thick-
ness, 0.6308. As the tensile strength of the
iron used was 45,267 pounds, the calculated
strength of the brace was 28,554 pounds.
Fig. 4 shows the specimen broke through
the crown of the eye at 19,810; 20,330, and
20,580 pounds respectively, the elongation
being 0.1875, 0.25 and 0.3125 inch respec-
tively. In a number of other bars the pro-
portions were varied, notably the depth
from the crown to hole and the breadth of
the shank, and as the result of these tests
the proportions given in Fig. 5 were adopt-
ed.

The disastrous results of that mode of mak-
ing them. The eye of the braces in Fig. 1,
the original shape of which is illustrated,
had an outside diameter of 1.936 inches, a
thickness of 0.504 inch, while the depth
from crown to hole was 0.605 inch, the
sectional area at sides of hole 0.0292 square
inch, and the sectional area of crown was
0.3150. The breadth of the shank of brace
was 1.25 inch, its thickness, 0.504 inch and its

area 0.63 square inch. As the tensile
strength of the bars was 45,267 pounds per
square inch, the calculated strength of the
shank of the brace was 28,518 pounds. The
first brace, one-fourth of which was imperfect,
as soon as 28,780 pounds were reached, the
specimen elongating 0.625 inch. The second
failed in a different way, breaking through
the upper part of the eye, after resisting
26,450 pounds and showing an elongation of
0.9375 inch. A bad weld one-third of which
was imperfect, brought the third to grief
when it had been strained only 19,520
pounds and had been stretched 0.25 inches.

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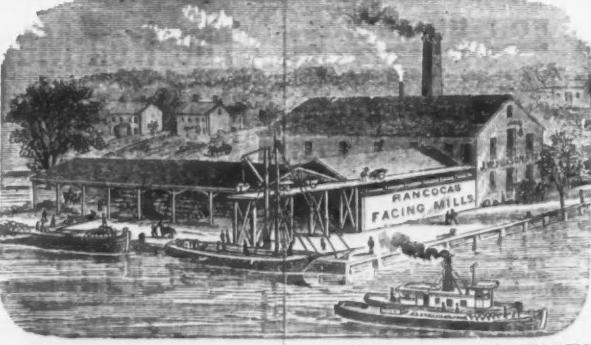
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Professors Morton, Mayer and Thomas, of the Stevens Institute of Technology, have come to the front with some

ELECTRICAL MEASUREMENTS OF AN EDISON LAMP,

and the conclusions which they reach on the basis of their experiments with the one

horse shoe in their possession, are somewhat

at variance with those obtained by Prof.

Barker and his associates. From an article

published by them in the *Scientific American* we take the following: A number of cells of

a small Grove battery were set up, each having

an active zinc surface of twenty square

inches, and a platinum surface of eighteen

square inches. It was found that when ten

cells had been thrown into circuit the horse

shoe showed a dull red, and with fifteen cells

a bright red. When thirty-four cells had

been introduced the light of one candle was

given, as measured with a Sugiy photometer,

with forty cells this rose to 4.5 candles; with

forty-five cells to 0.2, and with forty-eight

cells to sixteen candles. Taking the photo-

metric measurements with the carbon loop

at right angles to the axis of the photometer,

the resistance of the carbon thread was

found to be 123 ohms when the loop was

cold, 94 ohms when it emitted an orange

light, 83.7 ohms when it showed 0.9 candles,

79.5 ohms with five candles, and 75 ohms

with eighteen candles. They found that on

turning the lamp round so as to bring the

carbon loop with its plane parallel with the

axis of the photometer, so that it presented

its edge, the light was reduced to almost

one-third of what it was with the loop fac-

ing the photometer full. By measuring the

quantity of the current with the aid of a

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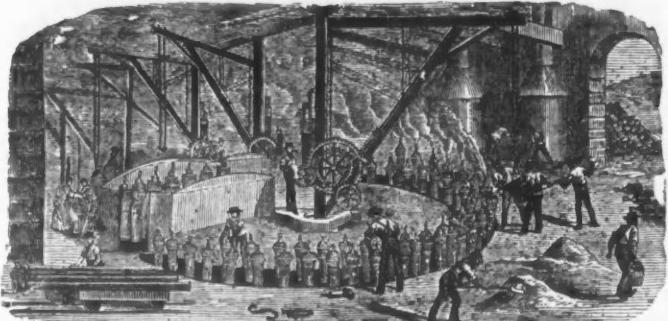
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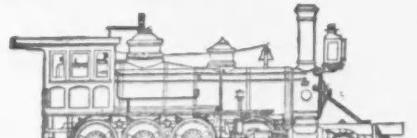
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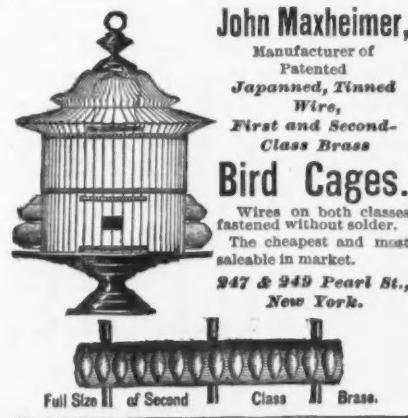
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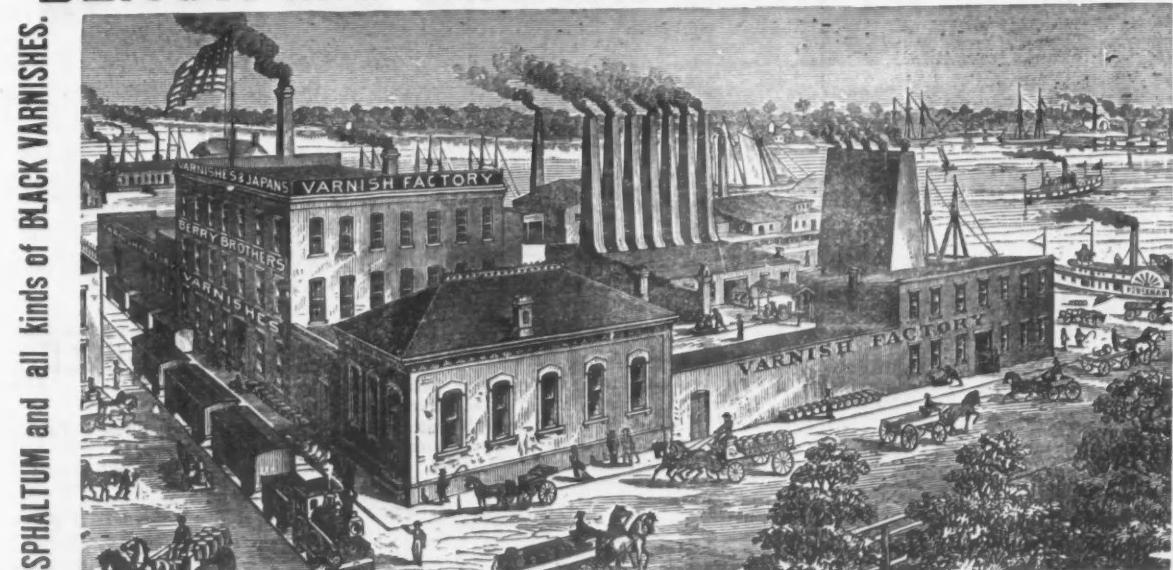
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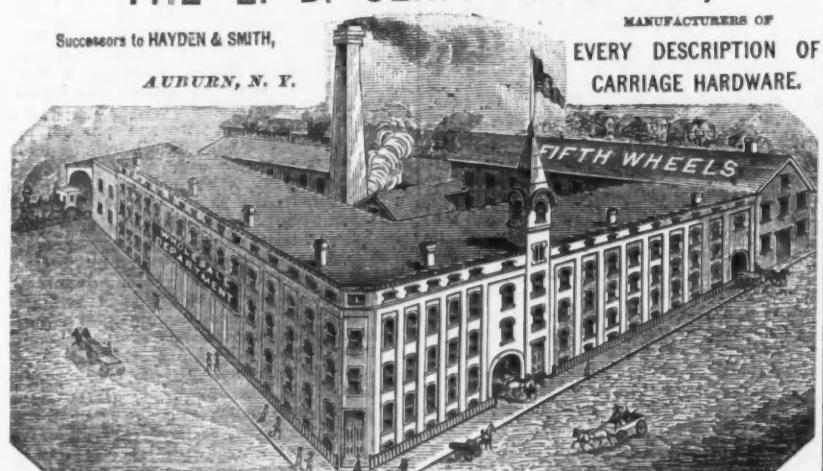
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N.Y. STENCIL WORKS. 87 Nassau St. N.Y. STEEL LETTERS, FIGURES &c.

SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice Crushers, being the only firm in the United States who manufacture all parts of the raw material. Examining Committee, consisting of 50,000 citizens of the United States have recom-



SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

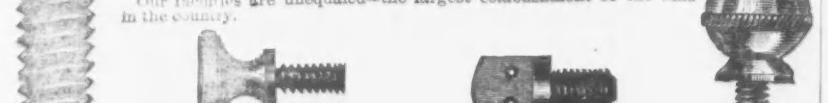
THE HARTFORD MACHINE SCREW CO.,

Manufacturers of

Hexagon Head Cap Screws, Round Head Set and Cap Screws, Square Head Set and Cap Screws, Machine Bolts, Gun Screws, Agraffes, Studs, and other articles turned from Steel, Iron or Brass by automatic machine.

HARTFORD, CONN.

Our facilities are unequalled—the largest establishment of the kind in the country.



FILES & RASPS,

Established 1868.
Best Cast Steel.
HAND-CUT. Manufactured by
JOHNSON & BRO.
No. 1 Commercial Street, Newark, N. J.

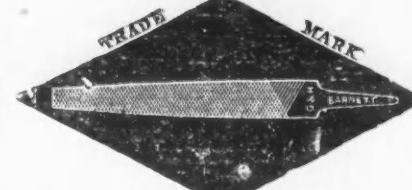
SPENCER & UNDERHILL,

94 Chambers St., New York, Agents for
American Screw Co.'s Wood Machine and
Rail Screws, Stove and Tire Bolts, Rivets, &c.
G. F. Warner & Co.'s Carriage Clamps.

DEPOT FOR
O. Ames & Son's Shovels, Spades and Scoops.
A. Field & Son's Tacks, Brads, Nails, &c.
Nicholson File Co.'s Files and Rasps.
W. & S. Butcher's Chisels, Gouges, Plane
Irons and Cleavers.
E. W. Gilmore & Co.'s Strap and T Hinges.
Russell Jennings' Auger and Dowel Bits.
Also a general assortment of Hardware.

TRADE MARK

Black Diamond File Works.



Awarded by Jurors of Centennial Exposition, 1876, for

"VERY SUPERIOR GOODS."

G. & H. BARNETT

39, 41 & 43 Richmond St., Philadelphia.

CHARLES B. PAUL,

Manufacturer of HAND CUT FILES.

187 Tenth Street, Williamsburg, New York.

Established 1863.



THE GIANT PAD LOCK.

Manufactured by
THE SMITH & EGGE MFG. CO.

(Centennial Award.)

"Superior in Every Respect."

This is one of the best selling Locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited. Address as above.

Lock Box 1705, Bridgeport, Conn.

PRIZE MEDALLISTS:

Exhibitions of 1862, 1865, 1867, 1873, and only award and medal for Noiseless Steel Shutters at Philadelphia, 1876, and Paris, 1878.

CLARK & CO.,

Original Inventors and Sole Patentees of

Noiseless Self-Coiling Revolving

STEEL SHUTTERS,

FIRE AND BURGLAR PROOF.

ALSO IMPROVED

Rolling Wood Shutters

Of various kinds. Endorsed by the Leading Architects of the World. Send for Catalogue.

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60,000 IN USE.

HOOSIER CORN DRILL.

Drops, with great regularity, one grain in a place, either 12, 16 or 20 inches apart, does the covering uniform in depth and is both time and labor saving. It gives a "sack" stalk its share of plant food, by which the quality is improved and yield increased from 10 to 20 bushels per acre over hill corn, hence is a splendid setting implement. Agents wanted in unoccupied territory. Send for circular.

Hoosier Drill Co., Richmond, Ind.

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VALVES.

ALSO,

FIRE HYDRANTS.

Axe, Hatchet, Powder and

Brush Machinery.

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ESTABLISHED 1852.

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All descriptions of Files made to order. Price List mailed on application.

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Wrought Iron Butts, Hinges

DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES:

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HARDWARE MANUFACTURERS' AGENTS, as follows:

Lawrence Curly Comb Co., Wheeling Hinge Co., Hill and Wrought Butts.

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Thompson, Derby & Co., Romeo & Co., Brass Locks, &c.

Scythes Snaths.

Otsego Fork Mills.

Steel Forging, Rakes, Hoes, &c.

H. Knickerbocker.

Scythes, Axes and Tools.

H. W. Kipp, Nail Hammers.

Klondike, Park & Co., Vises.

Locks, Nutstocks, Grub Hoes, &c.

Jacobs & Nitnick Mfg. Co., Locks, &c.

Banducky Tool Co., Planes and Planers, &c.

Geo. M. Eddy & Co., Measuring Tapes.

Measuring Tapes.

J. Mallinson, Cast Steel Shears and Scissors.

Ketcham's Pat. Metallic Sieves.

GRAHAM & HAINES,

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HARDWARE MANUFACTURERS' AGENTS, as follows:

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TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH WIRE NAILS, TACKS, SHOE NAILS, And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

DUC'S IMPROVED ELEVATOR BUCKET.

THE BEST FOR MILLS.
THE BEST FOR BREWERS.
THE BEST FOR MALTSTERS
THE BEST FOR MINERS.

Send for Circular.

MILL BUCKET. In 3/4 in. to 10 in.

T. F. ROWLAND, Sole Manufacturer, BROOKLYN, N. Y.

AMERICAN BOLT CO., Lowell, Mass., MANUFACTURERS OF Bolts, Nuts, Washers, Chain Links, Car Bolts, Bridge Bolts, Lag Screws, &c.

Hoisting Machinery
MANUFACTURED BY
CRANE BROTHERS MFG. CO.,
Chicago.

STAR LOCK WORKS.
ESTABLISHED 1836.

Trunk Locks, Door Springs, Trunk Stays, Keys, &c., &c.
Pad Locks, Scand. Pad Locks. With Flat Keys.
Dead Latches, Shackles secured to the Lock Box.
110 South 8th St., and Sansom, bet. 8th and 9th, PHILADELPHIA.



HILLEBRAND & WOLF.

ALWAYS ASK FOR

ESTERBROOK'S

Steel Pens.

THE MOST POPULAR PENS IN USE.

For Sale by all Stationers.

ESTERBROOK STEEL PEN CO.,
Works, Camden, N. J.

New York.

BUFFALO SCALE CO.,

BUFFALO, N. Y.

Manufacturers of

R. R. Track Scales, Hay Scales, Coal
Scales, Grain Scales, Platform
Scales, Counter Scales, &c.

Send for price list, stating what you want.

THE ANSONIA CORRUGATED STOVE PLATFORM, With Patented O. G. Border.

ROUND ZINC.

27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring no nailing or lining, the edge retaining its form. Superior pattern, finish and quality. Price as low as any.

Send for List and Discount.

Packed 12 in each case.



THE ANSONIA STOVE REST.



This Cut is the Actual Size of 2-inch.

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

RICHARD DUDGEON,

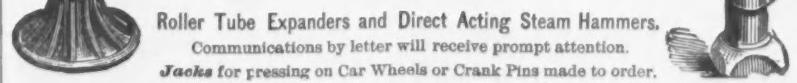
No. 24 Columbia Street, New York,

Maker and Patentee of the Improved

Hydraulic Jacks

AND

Punches.



Roller Tube Expanders and Direct Acting Steam Hammers.

Communications by letter will receive prompt attention.

Jacks for pressing on Car Wheels or Crank Pins made to order.

EVERY PUTNAM NAIL

Is drawn down to a point from the rod, thus:

It is the only Hot Forged and Hammer Pointed Horse Shoe Nail, made by machinery, in the World.

Some other manufacturers claim to make a hot forged Nail, but you will observe on all such a sheared edge near the point.

THE PUTNAM NAIL CO., Boston.

as a return circuit. By coupling up the various circuits running between Charing Cross and Victoria Station and employing the rails of the District Railway as earth circuits, Mr. Berly has been able to maintain five lights perfectly satisfactorily through a total circuit of seven miles, showing that a circular area may be illuminated from a central station of 3½ miles radius.

is, 37 feet high. They will also put up a new blower.

Rich deposits of iron ore have been found near Greencastle, Franklin County.

The Duncan Furnace is being repaired.

It will be in blast by June 1.

Furnace No. 2 of the Kemble Coal and Iron Co. at Riddlesburg was started on the 24th ult., and has been running excellently ever since. No. 1 has been blown out, after considerable labor, to keep it from chilling.

It is reported that the Schuylkill Iron Co., of Philadelphia, is about to build a new furnace, which will be located at Norristown.

The Laurel Iron Works, of Coatesville, after an idleness of six months, has resumed work.

The Etna Iron Works, Limited, of New Castle, have shut down.

A Japanese Railway Company have ordered an outfit of scales from Messrs. Rielle Bros., of Philadelphia. The order includes two 25-ton narrow-gauge track scales, two 6-ton warehouse scales, and a number of baggage and warehouse trucks and smaller scales. This firm is very busy on work for the United States government, and have doubled their force within the last three months.

PITTSBURGH AND VICINITY.

Anderson & Co. have started a new Siemens-Martin open-hearth steel furnace. This furnace has a capacity of 8 tons, and their other open-hearth furnace has a capacity of 15 tons.

Schoonmaker & Co. have bought 300 acres of coal land on the Broadford branch railroad for \$60,000, and are now contracting for a large number of improvements, among which are 300 coke ovens.

We understand that during last week Mr. Gilbert Rafferty, of Pittsburgh, whose coke interests are already very extensive, purchased another works near Mt. Pleasant, having 30 ovens in operation, for which the sum of \$40,000 cash was paid.

MARYLAND.

The Elk Ridge Furnace will probably be abandoned.

VIRGINIA.

The Callie Charcoal Furnace will soon blow in.

The Walton, Amherst, Gray Eagle and Panic furnaces are preparing to blow in.

The Lynchburg Iron, Steel and Mining Co. broke ground on the 3d inst. for a new furnace on their property in Lynchburg. They say they will be ready to blow in next July.

The James River Steel Manufacturing and Mining Co.'s rolling mill, at Lynchburg, has four double puddling furnaces, six heating furnaces, two trains of rolls and two spike machines. The works are managed by Mr. J. C. Jones. The plan of the company is to build a blast furnace.

Colonel Charles Scranton, of Oxford, N. J., has recently opened a shaft on a rich vein of iron ore in Culpepper County. According to Prof. Cook's analysis, the ore contains nearly 60 per cent. metallic iron, only 0.07 of phosphorus and no sulphur. It is apparently a large deposit. Colonel Scranton has also discovered a large vein of copper ore in the same county, not yet analyzed, but existing in great quantity. Both of these are very convenient to the Virginia Midland Railroad.

The Pennsylvania Steel Co. is obtaining large quantities of excellent iron ore from Pittsylvania County, which is being daily transported over the Virginia Midland, Baltimore and Ohio and Northern Central (Pa.) Railroad to Harrisburgh, Pa.

WEST VIRGINIA.

The Capon Iron Furnace property has been leased by Messrs. Bunting & Kesler, of Philadelphia, Pa., for a term of five years. They are putting the works in complete repair, and intend starting as soon as they can get ready.

KENTUCKY.

Of the charcoal furnaces of the Hanging Rock region, but three are in blast; and all of the charcoal stacks elsewhere in the State are out.

Mt. Savage furnace will blow in the first of May.

TENNESSEE.

The Southern States Coal, Iron and Land Company, at South Pittsburgh, Pa., have started the construction of a second furnace which is to be 18 feet bosh. The boiler and store foundations are nearly finished, and on Monday next the brickwork on the engine house, store and boilers will be commenced.

Two 8x18x48 engines, three Whitwell stoves, 18x40, and ten cylinder boilers, are to be made in England, and the cast house in Pittsburgh, Pa. The shops here are busy pushing the work as fast as possible, and the furnace is expected to be ready for blast in about five months. On two days of last month the present furnace, which is 20 feet bosh, made 70 tons each day.

The Oakdale furnace will soon go into blast.

The Bear Spring charcoal furnace will blow in May.

ALABAMA.

The Rock Run, Woodstock and Etna furnaces will make car-wheel iron during the present year. Both stacks of the woodstock are already in.

A new coke furnace is being built at Woodstock by Mr. H. D. DeBordaben, in company with Mr. Giles Edwards. The furnace will probably go into blast next month.

GEORGIA.

The present stack of the Cherokee charcoal furnace is in blast, and another stack is being built.

The Ridge Valley Furnace will soon be put in blast, and an effort is also being made to put the Rodgers Furnace in.

OHIO.

Lawrence Furnace banked up on the 8th, and will remain so until her stock comes in, which will be in about 30 days. She will start up on the old hearth, which is in good condition.

The Common Pleas Court of Jefferson County, on Saturday, appointed J. Nessley McIntosh, special master commissioner to sell the Irondale Furnace and mill, and ordered him to give bond in the sum of \$75,000, to be approved by the clerk.

It is stated that an extensive furnace

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of

PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave
"ELECTRIC RAZORS,"
And the "ELECTRIC SHEARS." Nickel Plated
Agents for the BENGAL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fish St., ST. LOUIS, MO.

MERIDEN CUTLERY COMPANY.

THE "PATENT IVORY" HANDLE TABLE KNIFE.

The oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE for Table Cutlery. A most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE, BUTCHER and HUNTING KNIVES. Illustrated catalogues with prices sent to the trade on application. SALESROOM, No. 49 Chambers St., N. Y. Address all communications to West Meriden, Conn.

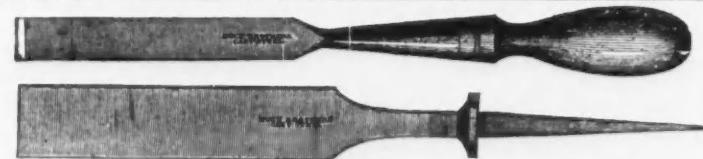


AARON BURKINSHAW,
Manufacturer of Pen and Pocket Cutlery, Pepperell, Mass.
Established 1833.

The Celebrated VICTOR Cast Shear
SOLD HARDWARE & NOTION DEALERS EVERY WHERE.
Special Attention given to brasses export
VICTOR CAST SHEAR 100
The largest Manufacturer of Cast Shears in the World.
Manufactured only by THE KENZ HARDWARE CO. of Cast Shears
BRIDGEPORT, CONN. U.S.A.

HENRY SEYMOUR CUTLERY CO.
Manufacturers of Full Nickel Plated and Maroon Japan Handle
SHEARS AND SCISSORS.
Every pair warranted. Sold by Hardware Dealers throughout the country.
Salesrooms, 84 & 86 Chambers Street, New York City. Manufactory, HOLYOKE, MASS.

JOHN WILSON'S CELEBRATED
TRADE MARK.
FOUR PEPPERCORNS AND A DIAMOND.
GRANTED A.D. 1760 BY THE
CORPORATION OF CUTLERS OF SHEFFIELD
AND PROTECTED BY ACT OF PARLIAMENT
REGISTERED ALSO AT
WASHINGTON U.S.A. ACCORDING TO ACT OF
CONGRESS
ALSO AT LEIPZIG, IN
ACCORDANCE WITH THE GERMAN TRADE
MARKS' REGISTRATION ACT.
WORKS: SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.



BUCK BROTHERS, Millbury, Mass.
The most complete assortment in the U. S. of
Shank, Socket Firmer and Socket Framing Chisels,
PLANE IRONS.
Gouges of all lengths and circles beveled inside and outside. Nail Sets, Scratch and Belt Awls, Chisel Handles. A full stock of Carving Tools. Also, small boxes of Tools of best quality.



CARRIAGE HARDWARE,
IVES, WOODRUFF & CO., Manufacturers,
Mt. CARMEL, CONN.

(Send for Catalogue.)

G. W. Bradley's Edge Tools.
Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grub Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Ring Bush Hooks,
Ax Eye Bush Hooks,
Socket Bush Hooks,
Watt's Ship Carpenters' Tools,
Carpenters' Drawing Knives,
Coopers' and Turpentine Tools.

FOR SALE BY
MARTIN DOSCHER, Agent, 85 Chambers Street, N. Y.

Cutlery.

ALFRED H. HILDICK,
19 Warren St., N. Y.,
Importer of CHAINS, ANVILS, VISES, &c.

Agency of
HILL BROTHERS & CO., WALSALL, ENGLAND
GENERAL HARDWARE MERCHANTS.
And of

BALL'S PAT. SOLID STEEL SHEEP SHEARS.

These shears are manufactured for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use either in the bow or at the junction of the shank and blade. Samples can be seen at above address, or sample lots furnished.



Joseph Rodgers & Sons'
(LIMITED)

CELEBRATED CUTLERY,
No. 92 Chambers Street, New York.
F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons' products having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.
To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

P. O. Box 3962.

ESTABLISHED 1836.

Alfred Field & Co.,
COMMISSION MERCHANTS,

New York, Birmingham, Sheffield, Liverpool.

Guns and Pocket Cutlery,
SPECIALTIES.

Headquarters for
ELEY'S BROS' GOODS, WRIGHT'S ANVILS,
WILSON'S BUTCHER KNIVES, &c.
WOSTENHOLM'S POCKET CUTLERY AND RAZORS,
BUTCHER'S FILES, TOOLS AND RAZORS,
STUBS' FILES, WESTERN FILES,
GREAVES' SHEEP SHEARS,
CHESTERMAN'S TAPES,
GERMAN COIL and HALTERS and other CHAINS,
BRADES' TROWELS and HOES,
CANASTOTA KNIFE CO.'S POCKET KNIVES.
Etc., Etc., Etc., Etc.

All sorts of Hardware and Merchandise for import and export purchased on commission.

ROBERT SORBY & SONS,
SHEFFIELD,

MANUFACTURERS OF THE CELEBRATED

Kangaroo Sheep Shears.

The best CORPORATE MARK
Shears
made.
Every
Shears
Guaranteed.

ALFRED FIELD & CO.,
93 Chambers St., NEW YORK,
SOLE AGENTS.

Send for price list and terms.

PHOENIX CASTOR CO.,
INDIANAPOLIS, IND.

Send for Illustrated Catalogue.



Eight thousand sold the first year.
TUCKER & DORSEY, Mrs.,
Indianapolis, Ind.



Can be applied to
any implement,
either with or
without tongue.
NO. 2
Send for Price and
Illustrated Circular.

M. E. Bunker & Co.,
Indianapolis, Ind.,
Makers.

The best selling implement in America. Make its acquaintance by sample order in time for spring trad.

Cutlery.

McCOY & CO.,

IMPORTERS OF

Hardware, Cutlery, &c.

SOLE AGENTS FOR

THEILE & QUACK'S
CELEBRATED

Pocket Knives and
Scissors.

A large stock of

Muzzle & Breech Loading

English Guns.

132 DUANE ST.,

NEW YORK.

Silver Medal, 1878—Paris.



J. R. SPENCER & SON,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

FILES

AND

STEEL,

Table Knives, Razors, Shovels, &c., &c.,

of every description.

CORPORATE MARK.

N SPENCER
SHEFFIELD

Granted 1749.

SCHRODER LOCK CO.,

Manufacturers of

BUILDERS' HARDWARE,

Locks, Latches,

HINGES,

AND

BRONZE & BRASS GOODS

of all kinds.

JAIL LOCKS.

Office and Works,

16 & 18 EAST 7th STREET,

CINCINNATI, OHIO.

A liberal discount to the

trade.

The backstrain when the wrench is used is borne by the bar—not by the handle.

The strongest Wrench made, and the only successful Re-enforced Bar.

No genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

CLOTHES WRINGERS.



T. J. ALEXANDER, Manager,
BOSTON, MASS.

J. R. TORREY RAZOR CO.

Office and Factory,

34 Southbridge St., Worcester, Mass.



No. 10.

Our Razors, in temper and workmanship, are not surpassed by any of foreign make, and are fully guaranteed in every respect. Price Lists on application.

THE SLAYTON RAZOR.



PERFECTION For Cutting Quality.
For Temper.

Handles of German Silver, Nickel Plated. Blades of the Finest Steel in the World. Every Razor Fully Warranted.

L. C. TOWER, Thermometer Manuf.,

39 Exchange St., Rochester, N. Y., Sole Agent.

Canvassers wanted.

JAMES COMLY,

4739 Paul St., Frankford, Philadelphia, Pa.,
Manufacturer of

Hardware Novelties, Glass Cutters, &c.

GEO. M. EDY & CO.,

Manufacturers of

Measuring Tapes

OF COTTON, LINEN & STEEL.

FOR ALL PURPOSES.

351 to 353 Classon Ave., Brooklyn, N. Y.

CHAS. E. LITTLE,

59 Fulton St., N. Y.

Solid Cast-Steel Pump Augers

For Boring Pump Logs and Pump
Tubing, with all necessary fittings. Agency for
Barnes' Wood-Working Machinery

THE WM. ROGERS MFG. CO., MANUFACTURERS OF Superior Electro Silver-Plated Table Ware.



W.M. ROGERS,
Senior Member and Manager of ROGERS BROTHERS.
On Knives.



F. WILLSON ROGERS,
Son of the late Wm. Rogers.
On Spoons.

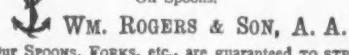


Our KNIVES are guaranteed to STRIP
12 dwt. of Silver per Dozen.
All goods are put up ONE DOZEN IN A BOX.
All our KNIVES are put up in the latest
and most attractive style, with guarantee
card in every box.

OUR GOODS ARE PLATED 20 PER CENT. ABOVE STANDARD PLATE.

P. O. Address, Drawer 30, Hartford, Conn.

Depot, No. 100 Chambers Street, New York.



Our SPOONS, FORKS, etc., are guaranteed to STRIP
On Tea Spoons 48 dwt. per gross.
On Dessert Spoons and Forks 72 dwt. per gross.
On Table Spoons and Medium Forks, 96 dwt. per gross.

ALL OTHER GOODS IN PROPORTION.
All our SPOONS, FORKS, etc., are plated upon
18 PER CENT. NICKEL SILVER,

The best base known for plating upon.



Sextuple Plate.

Our Hollow Ware is plated upon the
FINEST WHITE METAL, and is guaranteed
to be plated fully

50 Per Cent. More Silver
than any other brand of goods in the market.

The Burgess Steel and Iron Company have
commenced rebuilding, and will be in opera-
tion again in a short time.

plant is to be erected on the Harold property, on the main line of the C. H. & V. R. R.

Of the furnaces in the Hanging Rock region, the following are expected to blow in next month: Bloom, Buckeye, Buckham, Eagle, Hampden, Jefferson, Mount Vernon and Richland, all charcoal; also, Ironton and Vinton.

Monitor Furnace will shortly be put in blast by the new Car Wheel Iron Company.

The Union Iron Mills, of Newburg, which have been idle for a long time, having about completed repairs, will start up in a few days.

The Burgess Steel and Iron Company have commenced rebuilding, and will be in operation again in a short time.

Eight of the sixteen puddling furnaces of the Cherry Valley Iron Company, at Leetonia, will be started up as soon as the new machinery is put in working order. The entire mill will soon be put into full operation.

The Britton Iron and Steel Company, of Cleveland, are working full time and report prospects first-class.

Matters at Niles are going on prosperously. The Niles Iron Co. are stopped only temporarily. The Falcon Iron and Nail Co. have their puddle mill running. L. B. Ward (the Russia mill) is running full in every department.

INDIANA.

There are now but four furnace stacks in Indiana—two of the Vigo, the Brazil and the Shoals. All the others have been wrecked and sold for scrap. The Shoals is preparing to blow in.

The Louisville Plate Glass Works, at New Albany, have started up with French workmen. They will be run at full capacity.

ILLINOIS.

The Union Rolling Mills, Chicago, employ 800 hands and are running double turn. The converting mill is turning out 165 tons of bar steel per day. The output of the ore mill is 100 tons of pig iron daily. The annual capacity of the ore mill is 37,000 tons, and of the converting mill, 60,000 tons. The electric light placed in the converting mill had to be removed, as it was too bright for the workmen's eyes, but it is still retained in other parts of the works, where it gives good satisfaction. Owing to broken spindle in one set of rolls, the rail mill was obliged to shut down for three days last week. A large force is now employed on the new addition to the works, which is being pushed forward to completion as rapidly as possible.—*Industrial World*.

At the works of the Northwestern Car Shops, Chicago, they are manufacturing a large amount of electric light machinery.

The glass works, Ottawa, employ 125 hands in the manufacture of window glass. The buildings are of brick. There are 20 pots, producing about 70,000 boxes of glass per season. The sand is procured but a short distance from the works. Coal is brought in the company's cars from Streeter.

The Union Iron and Steel Company are constructing two additional blast furnaces, which will be 16 by 74. They will be supplied with the Whitewell stove and engines built by the Cuyahoga Company, of Cleveland. They expect to have the furnaces in blast about October 1.

One of the Joliet furnaces will go into blast about the 1st of May.

MICHIGAN.

The following is the record, from the start, of the new Spring Lake Charcoal Furnace, furnished us by Major Harry Pickands, the manager: First week, 283 tons (of 2268 pounds); second week, 331 tons; third week, 343 tons; fourth week, 357 tons, and fifth week, ending Saturday night, the 10th, 376 tons.

The Excelsior Furnace was lighted on the 4th inst.

Work has been commenced at the Marquette and Pacific Rolling Mill Furnace, and it will probably be ready to light up in a month or two.

WISCONSIN.

The furnace of the Northwestern Iron Company, at Milwaukee, will be blown in about May 1.

MISSOURI.

None of the charcoal furnaces in this State are in blast. The Midland, however, is lining up, and two new ones—the Sligo and the Nova Scotia—are being built.

The Missouri Blast Furnace Company are putting in a new blast engine at their works. They intend to pull down one of their stacks and rebuild.

LABOR AND WAGES.

The molders at a number of the machine shops at Pittsburgh are on a strike against a reduction of 15 per cent. in wages.

The laborers at the mills of Jones & Laughlin, Pittsburgh, struck last Saturday against a reduction in wages made necessary by the reduction in the card on iron.

The strike at Brown & Co.'s Mill, Pittsburgh, is over, the raller agreeing to pay his under hands the price demanded.

The rolling mills in Eastern Pennsylvania are giving notices of reduction in wages.

With the reduction in pig iron, wages at the blast furnaces of the East are being reduced.

The puddlers have established a rule at Brown, Bonnell & Co.'s, that no furnace shall be charged before 4 o'clock in the morning, and if the last heat is not out by 11 a. m., the furnaces shall not be charged again. The claim of poor iron is the cause of this rule being established.—*Youngstown (Ohio) News*.

It is reported that an agreement has been reached among Eastern iron masters to attempt to reduce all classes of skilled labor on the first of May from 10 to 16 per cent.

At the recent meeting of the Eastern Iron Masters' Association, a paper was read by one of the members, showing the difference between the wages paid in this country and England, and in which he claimed that while the price of puddling in the iron centers of this country ranges from \$5.50 to \$6 per day, it never exceeded \$2 in England. This last statement is not correct, as at the pres-

ent time, in some parts of England, puddling is 10/, or roughly, \$2.50.

The Baltimore and Ohio Railroad Company has inaugurated a new departure, in the organization of a relief fund for the benefit of employees. All employees injured while in the discharge of their duty will receive help, and in case of their death aid will be extended to their families. One of the features of the plan is to engage a surgeon to attend all such persons or employees, the charges to be on a basis agreed upon. The employees contribute to the fund, and when they meet with any mishap, all that is necessary for them to do is to present their certificate to the surgeon and he draws on the fund for his services.

The Vulcan Steel Works at St. Louis, Mo., are idle by reason of labor difficulties, after having been in operation but about a month. Our readers will remember that a strike at these works about a month ago resulted in the adoption of the Joliet scale of prices, this being the demand of the men, the offer of the works being the Pittsburgh scale. Under the scale demanded by the men, the wages for some classes of work were not only less than had been offered, but less than they were receiving, and first one gang and then another struck for the scale they had refused and against the scale they had insisted upon. As a result, all of the works is closed and will remain so until it can be started upon the Pittsburgh scale.

The strike in the Clearfield, Pa., coal fields is nearly at an end.

METALLURGICAL NOTES.

DEPHOSPHORIZATION OF STEEL.

In the specification of the English patent No. 1267 of 1874, granted to Mr. James Henderson, of this city, for the manufacture of cast steel, it is stated that "metal partly refined in the Bessemer converter, and from which the phosphorus and sulphur have not been removed by the reagents of his invention of fluorides and oxides, using, preferably, fluorspar and titaniferous iron ore in the proportions of about 40 parts, by weight, of fluorspar to 100 parts, by weight, of titaniferous iron ore. The Bessemer metal may be charged from the converter either at the third period of the Bessemer process, which is known as "after the boil," at which time the carbon is reduced to about one per cent., or at the end of the blowing, when nearly all of the carbon is removed, the proportions of the reagents depending upon the quantities of carbon and phosphorus in the metal. Mr. Henderson states that if, for example, the carbon present is one per cent. and phosphorus one per cent., the amount of fluorspar and titaniferous iron ore will be about 2 to 3 cwt. of the mixture to a ton of steel. The conversion is conduct in and open-hearth reverberatory gas furnace, with temperatures above the melting point of wrought iron, and the metal is cast into ingots. In 1870 a patent was granted to Mr. Henderson for the production of iron and steel by the use of fluorides and oxides, in which he specifies the use of lime, limestone, magnesia, magnesian lime and magnesian limestone linings upon which the fluorides and oxides are charged. He proposes to prepare the linings in several new and economical ways. Lime, freshly burned and while hot from the kiln is very finely pulverized, mixed with 5 per cent. of fluorspar and rammed into the hearth of a furnace or converter. When a white heat is applied the fluorspar speedily sets the lime, so that it forms a hard, durable lining. Magnesian lime mixed with 1½ to 2 per cent. of fluorspar answers the purpose equally well. The magnesian lime may be used in a plastic condition, after being rendered so by being mixed with water or molasses, or a mixture of both, with fluorspar or cryolite, the material thus made being applied to the sides of the furnace or converter, or to plumbeous crucibles used in the production of cast steel. Magnesian lime, when mixed with molasses, sets rapidly, and when dried is hard and durable, and when applied in a plastic state is ready for use as soon as it dries, or it may be formed into bricks and dried. Starch and water or dextrine may be treated with water acidulated with sulphuric acid, as in producing grape sugar, and the syrup thus produced may be used in place of molasses; or the starch and water or dextrine may be used without further preparation. These substances give the best results with lime, but molasses is preferred for magnesian lime. When mixed with fluorspar or cryolite a hard, durable brick is produced by heating for a short time at high temperature. Raw dolomite, finely pulverized and mixed with 1 to 2 per cent. of fluorspar or cryolite, may be used for a lining, or it may be mixed with molasses, either with or without fluorspar or cryolite. The lime which has given the best results is from a very pure carbonate, quarried near Columbus, Ohio, containing about 95 per cent. of carbonate of lime and 5 per cent. of magnesia, silica, alumina and oxide of iron. The dolomite which has proved best adapted to the purpose is that from Mr. Frey's quarries, in Springfield, Ohio, which is composed of carbonate of lime, 54.7 per cent.; carbonate of magnesia, 44.9 per cent.; silica, 0.10 per cent.; alumina and oxide of iron, 0.20 per cent. Mr. Henderson showed us, early last summer, specimens of lime cemented by the action of heat upon the fluorspar mixed with it. He says that a very intense and long-continued heat is unnecessary when bricks are made by this process, and that they may be burned in ordinary kilns lined with siliceous material. The siliceous material is covered with wooden boards, upon which the bricks to be burnt are piled, thus preventing the ignition of the wood and causing the brick to be burned in a carbonizing or reducing flame, with only enough heat to set the fluorspar.

THE VOLHARD SILVER ASSAY.

Herr Hanns von Juettner publishes in the *Oest. Zeitschr.* some interesting details on the Volhard silver assay, which is regarded by many German chemists as superior to the well-known Gay Lussac method. Volhard titrates with a standard solution of sulpho-cyanide of potassium or ammonium, which precipitates silver as sulpho-cyanide, insoluble in acids. Ferric sulphate or iron alum is added as an indicator, and the faintest excess of sulpho-cyanide of potassium is

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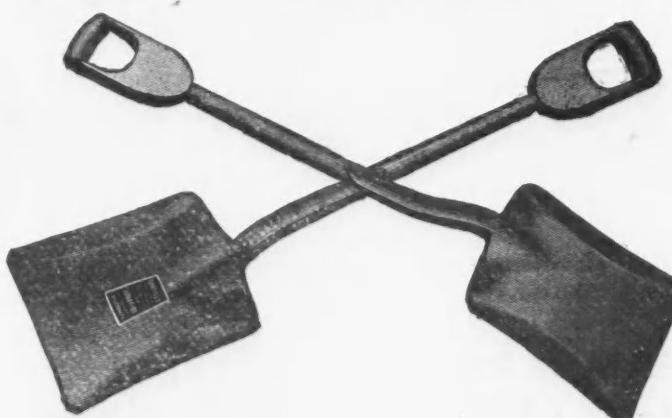
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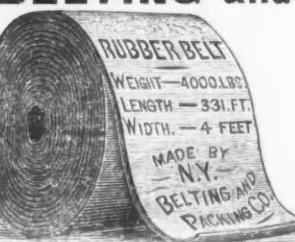
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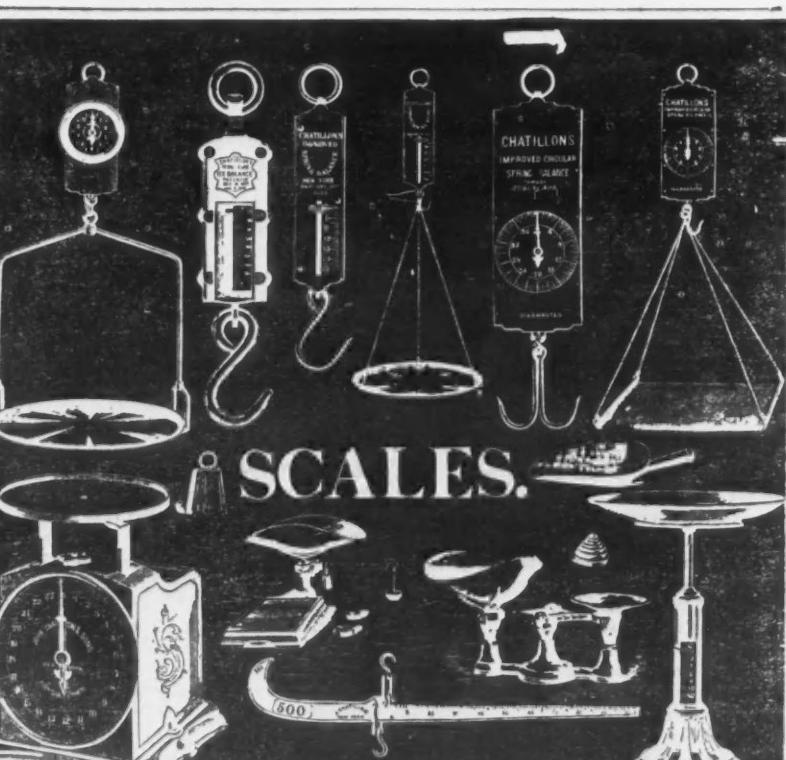
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shown by the production of sulphy-cyanide of iron, which gives the liquid a red tinge. Herr Juettner found that a solution holding one part of silver to 100,000 parts of water is rendered plainly turbid throughout, and that with 1,500,000 parts of water to one part of silver, the point where the sulphy-cyanide of potassium flows into the solution is rendered turbid, but that nothing is visible when the dilution has reached 3,000,000 parts of water to one part of silver. He ascertained that the red tinge, showing the excess of the precipitant, was visible if 0.015 milligrams of sulphy-cyanide of ammonium was added to 200 cubic centimeters of liquid. A large number of alloys of silver and gold and silver and copper were tested, accurate assays being made at the same time with the Gay Lussac and other methods, and a very close coincidence was observed in all cases. It was found also, that by using small quantities of substance, about 0.5 gram, alloys high in copper, which were hitherto regarded as presenting grave obstacles, were assayed with great accuracy. A person without any skill in volumetric work made assays of alloys and obtained the fineness correct to within one-thousandth. Herr Juettner states that he has also used the Volhard method for estimating sulphur in solutions of the alkaline sulphides, sulphurated hydrogen, and of those metallic sulphides which yield sulphuretted hydrogen without the formation of free sulphur. He gives the results of some experiments which prove the great accuracy and efficiency of this method, which, besides, he has applied with success to the estimation of mercury, nickel and cadmium.

PARTING SILVER FROM GOLD BY CHLORINE GAS.

A process which has attracted much attention in Europe in metallurgical circles, when first described as it is worked on a large scale at Sydney, New South Wales, is that introduced by Mr. F. B. Miller for toughening the brittle gold as delivered by the miners of the Australian placers to the Sydney mint. An elaborate description of Miller's process of parting silver from gold is given in Dr. Percy's work, "Silver and Gold," Part I, a publication which has just come from the press in England. Although Miller's patent is dated 1867, Percy shows that substantially the same method was proposed and experimented with by Mr. Lewis Thompson as early as 1838, and that one of the most important facts bearing upon its successful application—the non-volatility of chloride of silver in presence of alkaline chlorides—was noted and commented upon by Mr. Arthur Aikin, a prominent English chemist of that time. While, therefore, Miller cannot claim to be the first to suggest the use of chlorine gas passed through molten gold, he is certainly the first who carried this method of purifying that metal and separating silver from it to a successful practical issue. Two objects are effected by this chlorine process at the same time—namely, the separation and the saving of the silver in the gold, and the removal of brittleness when the precious metal under treatment is rendered liable to that defect by the presence of impurities. The chlorine is generated in glazed stoneware jars by allowing hydrochloric acid to act upon black oxide of manganese, and is conducted by vulcanized caoutchouc tubing to a chlorine pipe of fire-clay. The latter dips into the molten gold contained in a clay crucible, set into a larger plumbago crucible, which is heated in an ordinary air furnace. One imperial gallon of acid of 1.5 specific gravity is generally allowed for every 10 ounces of silver in the gold operated on. The gas passes through the gold quietly, no ebullition taking place. When the operation is nearly over, fumes of a darker color make their appearance, and the end of the refining is indicated by a peculiar flame of a brownish yellow color. The operation is considered to be completed as soon as the flame imparts a brownish yellow stain to a piece of white tobacco pipe. In the case of gold containing about 10 per cent. of silver, this takes place after the lapse of an hour and a half. The crucible full of gold is then taken out of the fire and the gold is allowed to solidify; the liquid, red-hot chloride of silver, is poured off into iron ingot molds. The chloride still contains gold in a fine state of division, mechanically intermixed, and possibly also some in the shape of double chlorides. The bulk of this is precipitated by remelting the chloride along with 8 to 10 per cent. of metallic silver. The gold alloys with the metallic silver and collects in a button at the bottom of the crucible. With proper care the quantity of gold remaining in the separated silver ought not to exceed 3 parts in 10,000. The chloride of silver cakes are reduced in a very suitable apparatus, designed by Leibius of the Sydney Mint, by means of metallic zinc, the quantity used being about 25 per cent. of the weight of the chloride of silver reduced. The average loss of gold is given at 10 parts per 100,000 of gold treated, while that of silver amounted to 240 parts, no allowance having been made in computing these figures for the quantities of metal to be recovered from the crucibles, ashes, &c. The fineness of the gold after treatment ranges from 991 to 997.

THE SIEMENS FURNACE AND THE PRUSSIAN PATENT OFFICE.

One of the most remarkable and curious cases of a refusal to grant a patent is that by which the Siemens regenerative system has become common property in Prussia. Mr. Jessen, in his new work on steel, relates that the Patent Office of that country founded its action on the alleged resemblance of that important innovation in metallurgical furnaces with one particular mediæval warming apparatus. This apparatus, the only one of its kind, was found at the palace abbey, or preceptory at Marienburg, in Prussia, which formed the headquarters of the Teutonic knights, and is supposed to belong to the latter half of the fourteenth century. It was used for warming rooms in the building in question. A fire was made in the lower part of the fur-

nace, and the products of combustion, passing through the stones placed in the upper division, escaped into the flue. When the stones had become thoroughly heated the fire was extinguished and the flue closed by a damper. The apertures in the floors of the apartments to be warmed being now opened, cold air was allowed to pass through the heated stones, and, becoming warmed in its passage, entered the floor of the rooms through the registers. Some of the furnaces were tried a few years since, and when they had not been meddled with on the pretense of "restoration," were found to be perfectly effective. This contrivance, the wiseacres of the Prussian Patent Office decided was an anticipation of an invention which has enabled us to melt large masses of metal which had, until its introduction, been quite intractable. It is perhaps no more than just to the present authorities of the Imperial German Patent Office to add that the spirit of its predecessor has vanished with the introduction of the patent law.

The Rights of Chinese in California.

In the United States Circuit Court at San Francisco, on Monday, March 22, a decision was rendered in the *habeas corpus* case of Tibercia Parrott, which was brought to test the constitutionality of an act of the California Legislature prohibiting the employment of Chinese by corporations. Judge Sawyer said that the duties of his office had precluded his filing a written opinion in the case, but that his conclusion was that the act was in contravention of the treaty between the United States and China, and with the fourteenth amendment to the Constitution, and with the laws passed in conformity with it. Judge Hoffman then read the decision of the court. In effect, the decision declares the anti-Chinese law enacted by the present Legislature of the State to be in conflict with the United States treaty with China and the Constitution of the United States. In rendering his decision, the Judge quoted an unusual number of authorities. He said that if the right of a Legislature to restrict corporations in the manner intended by the law in question should be admitted, there would be no limit to the harm which might be accomplished. The Chinese are here, and by a solemn treaty are granted all the benefits of trade or travel which are enjoyed by any other foreigners. If a Legislature has the power to declare that corporations shall not employ Chinese, they possess the same right to declare that the Germans, Irish, or Americans shall not be so employed. Further, they could exercise the right to declare that the employees of corporations shall be of a certain creed. If the facts of the law's enactment were not before us, it would be difficult to believe that a Legislature could declare as law so seemingly contemptuous a breach of treaty obligations. In conclusion, Judge Hoffman remarked: "It is generally admitted by the best classes on the coast that the unrestricted immigration of Chinese is a menace to our peace, and even to our civilization. It is an evil, however, which the abrogation or amendment of the Burlingame treaty alone can remedy. The senseless cry of 'The Chinese must go' is an insolent denial of the authority of the United States, and any measure of police or health laws, or State legislation, made in the spirit of that cry will be promptly set aside by the courts of the United States." The case will probably be taken to the United States Supreme Court, Gen. Butler having announced his willingness to manage the case for the people.

Fall of a Pot of Melted Steel.—The Pennsylvania Steel Works, at Steelton, Pa., was the scene of a frightful accident at 5 a. m. on April 15. While the men were at work where the steel is made the natchet controlling the movement of the large vessel holding the molten metal broke. The retort turned upside down, and the contents were poured into the pit underneath, and around which eight men were employed. George Yost and a man named Westbrook were so badly burned that their lives are despaired of. Monroe Miller, Simon Martin, George Horning and one or two others were also badly burned.

The American double iron rope system has been adopted by the constructors of the railway up Mount Vesuvius. There are two lines of rails, each provided with a carriage divided into two compartments, and capable of holding six persons. While one carriage goes up the other comes down, thus establishing a counterpoise which considerably economizes the steam of the stationary traction engine. The incline is extremely steep, commencing at 40°, increasing to 63°, and continuing at 50° to the summit. Every possible precaution has been taken against accident, and the railway itself is protected against possible flows of lava by an enormous wall. The ascent will be made in eight or ten minutes. To obtain the necessary supply of water, large covered cisterns have been constructed, which in the Winter will be filled with snow that often falls heavily on Vesuvius. This snow will be quickly melted by the internal heat, and, besides the water thus obtained, the frequent rainfall will also be conducted into the cistern. An elegant cafe restaurant, capable of accommodating 100 persons, will be attached to the station. Above the entrance of the latter is an ample terrace supported on columns, whence an enchanting view is obtained not only of the Gulf of Naples, but also those of Baiae and Gaeta, each dotted with its islands.

A series of experiments on the electro-deposition of bismuth with various solutions of this metal, has recently been carried out in the laboratory of Mr. D. G. Fitzgerald. Sesquioxide of bismuth, dissolved in a hot solution of the double tartrate of soda and potash—Rochelle salt—was found to give excellent results at a temperature of about 160° F. The anode should be considerably larger than the cathode or article to be plated, and the electro-motive force should be between one and two volts. A perfectly adherent deposit of silvery luster, but of a darker color than silver and not liable to tarnish, may readily be obtained on iron or steel, copper and brass.

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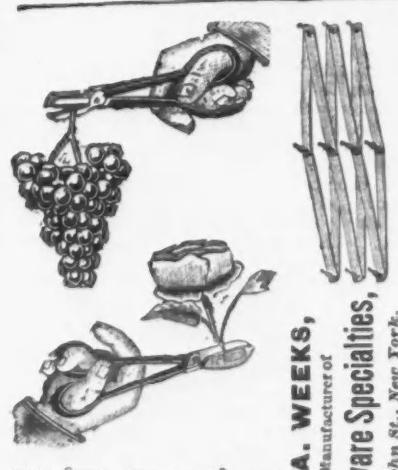
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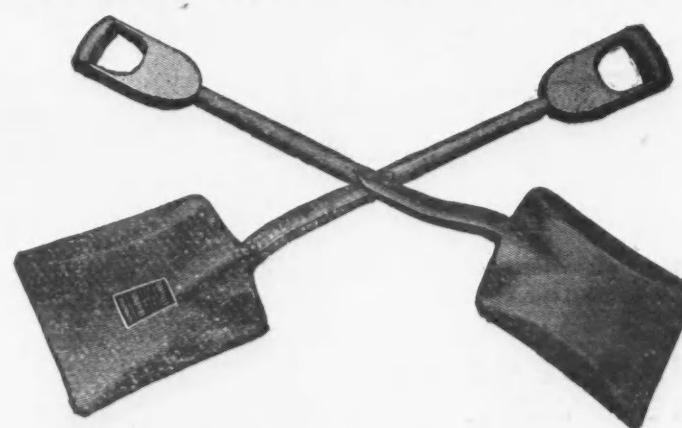
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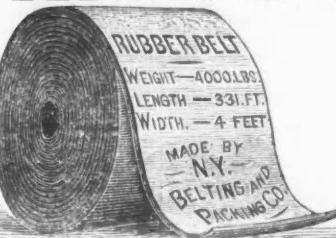
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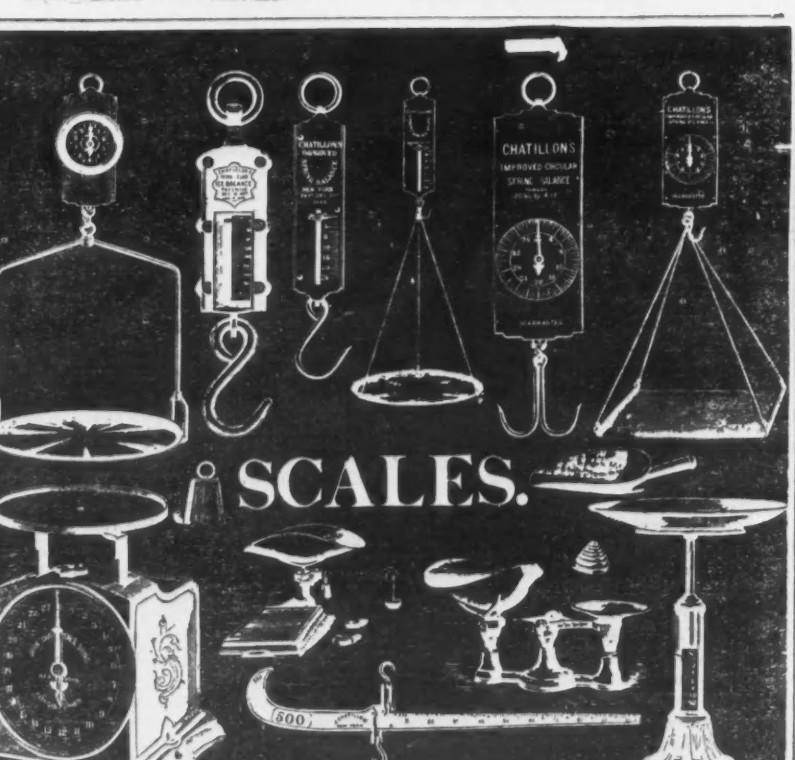
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shown by the production of sulpho-cyanide of iron, which gives the liquid a red tinge. Herr Juettner found that a solution holding one part of silver to 100,000 parts of water is rendered plainly turbid throughout, and that with 1,000,000 parts of water to one part of silver, the point where the sulpho-cyanide of potassium flows into the solution is rendered turbid, but that nothing is visible when the dilution has reached 3,000,000 parts of water to one part of silver. He ascertained that the red tinge, showing the excess of the precipitant, was visible if 0.015 milligrams of sulpho-cyanide of ammonium was added to 200 cubic centimeters of liquid. A large number of alloys of silver and gold and silver and copper were tested, accurate assays being made at the same time with the Gay Lussac and other methods, and a very close coincidence was observed in all cases. It was found also, that by using small quantities of substance, about 0.5 gram, alloys high in copper, which were hitherto regarded as presenting grave obstacles, were assayed with great accuracy. A person without any skill in volumetric work made assays of alloys and obtained the fineness correct to within one-thousandth. Herr Juettner states that he has also used the Volhard method for estimating sulphur in solutions of the alkaline sulphides, sulphurated hydrogen, and of those metallic sulphides which yield sulphuretted hydrogen without the formation of free sulphur. He gives the results of some experiments which prove the great accuracy and efficiency of this method, which, besides, he has applied with success to the estimation of mercury, nickel and cadmium.

PARTING SILVER FROM GOLD BY CHLORINE GAS.

A process which has attracted much attention in Europe in metallurgical circles, when first described as it is worked on a large scale at Sydney, New South Wales, is that introduced by Mr. F. B. Miller for toughening the brittle gold as delivered by the miners of the Australian placers to the Sydney mint. An elaborate description of Miller's process of parting silver from gold is given in Dr. Percy's work, "Silver and Gold," Part I, a publication which has just come from the press in England. Although chiefly useful in countries where the more costly plant of parting with either sulphuric or nitric acid cannot be used, and, therefore, hardly applicable in this country, the process presents some features which call for more than a passing notice. Although Miller's patent is dated 1867, Percy shows that substantially the same method was proposed and experimented with by Mr. Lewis Thompson as early as 1838, and that one of the most important facts bearing upon its successful application—the non-volatility of chloride of silver in presence of alkaline chlorides—was noted and commented upon by Mr. Arthur Aikin, a prominent English chemist of that time. While, therefore, Miller cannot claim to have been the first to suggest the use of chlorine gas passed through molten gold, he is certainly the first who carried this method of purifying that metal and separating silver from it to a successful practical issue. Two objects are effected by this chlorine process at the same time—namely, the separation and the saving of the silver in the gold, and the removal of brittleness when the precious metal under treatment is rendered liable to that defect by the presence of impurities. The chlorine is generated in glazed stoneware jars by allowing hydrochloric acid to act upon black oxide of manganese, and is conducted by vulcanized caoutchouc tubing to a chlorine pipe of fire-clay. The latter dips into the molten gold contained in a clay crucible, set into a larger plumbago crucible, which is heated in an ordinary air furnace. One imperial gallon of acid of 1.5 specific gravity is generally allowed for every 10 ounces of silver in the gold operated on. The gas passes through the gold quietly, no ebullition taking place. When the operation is nearly over, fumes of a darker color make their appearance, and the end of the refining is indicated by a peculiar flame of a brownish yellow color. The operation is considered to be completed as soon as the flame imparts a brownish yellow stain to a piece of white tobacco pipe. In the case of gold containing about 10 per cent. of silver, this takes place after the lapse of an hour and a half. The crucible full of gold is then taken out of the fire and the gold is allowed to solidify; the liquid, red-hot chloride of silver, is poured off into iron ingot molds. The chloride still contains gold in a fine state of division, mechanically intermixed, and possibly also some in the shape of double chlorides. The bulk of this is precipitated by remelting the chloride along with 8 to 10 per cent. of metallic silver. The gold alloys with the metallic silver and collects in a button at the bottom of the crucible. With proper care the quantity of gold remaining in the separated silver ought not to exceed 3 parts in 10,000. The chloride of silver cakes are reduced in a very suitable apparatus, designed by Leibius of the Sydney Mint, by means of metallic zinc, the quantity used being about 25 per cent. of the weight of the chloride of silver reduced. The average loss of gold is given at 19 parts per 10,000 of gold treated, while that of silver amounted to 240 parts, no allowance having been made in computing these figures for the quantities of metal to be recovered from the crucibles, ashes, &c. The fineness of the gold after treatment ranges from 99 to 99.97.

THE SIEMENS FURNACE AND THE PRUSSIAN PATENT OFFICE.

One of the most remarkable and curious cases of refusal to grant a patent is that by which the Siemens regenerative system has become common property in Prussia. Mr. Jeans, in his new work on steel, relates that the Patent Office of that country founded its action on the alleged resemblance of that important innovation in metallurgical furnaces with one particular medieval warming apparatus. This apparatus, the only one of its kind, was found at the palace abbey, or preceptory at Marienburg, in Prussia, which formed the headquarters of the Teutonic knights, and is supposed to belong to the latter half of the fourteenth century. It was used for warming rooms in the building in question. A fire was made in the lower part of the furnace, and the products of combustion, passing through the stones placed in the upper division, escaped into the flue. When the stones had become thoroughly heated the fire was extinguished and the flue closed by a damper. The apertures in the floors of the apartments to be warmed being now opened, cold air was allowed to pass through the heated stones, and, becoming warmed in its passage, entered the floor of the rooms through the registers. Some of the furnaces were tried a few years since, and when they had not been meddled with on the pretense of "restoration," were found to be perfectly effective. This contrivance, the wisecracks of the Prussian Patent Office decided was an anticipation of an invention which has enabled us to melt large masses of metal which had, until its introduction, been quite intractable. It is perhaps no more than just to the present authorities of the Imperial German Patent Office to add that the spirit of its predecessor has vanished with the introduction of the patent law.

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The Rights of Chinese in California.

In the United States Circuit Court at San Francisco, on Monday, March 22, a decision was rendered in the *habeas corpus* case of Tibercia Parrott, which was brought to test the constitutionality of an act of the California Legislature prohibiting the employment of Chinese by corporations. Judge Sawyer said that the duties of his office had precluded his filing a written opinion in the case, but that his conclusion was that the act was in contravention of the treaty between the United States and China, and with the fourteenth amendment to the Constitution, and with the laws passed in conformity with it. Judge Hoffman then read the decision of the court. In effect, the decision declares the anti-Chinese law enacted by the present Legislature of the State to be in conflict with the United States treaty with China and the Constitution of the United States. In rendering his decision, the Judge quoted an unusual number of authorities. He said that if the right of a Legislature to restrict corporations in the manner intended by the law in question should be admitted, there would be no limit to the harm which might be accomplished. The Chinese are here, and by a solemn treaty are granted all the benefits of trade or travel which are enjoyed by any other foreigners. If a Legislature has the power to declare that corporations shall not employ Chinese, they possess the same right to declare that the Germans, Irish, or Americans shall not be employed. Further, they could exercise the right to declare that the employees of corporations shall be of a certain creed. If the facts of the law's enactment were not before us, it would be difficult to believe that a Legislature could declare as law so seemingly contemptuous a breach of treaty obligations. In conclusion, Judge Hoffman remarked: "It is generally admitted by the best classes on the coast that the unrestricted immigration of Chinese is a menace to our peace, and even to our civilization. It is an evil, however, which the abrogation or amendment of the Burlingame treaty alone can remedy. The senseless cry of 'The Chinese must go' is an insolent denial of the authority of the United States, and any measure of police or health laws, or State legislation, made in the spirit of that cry will be promptly set aside by the courts of the United States." The case will probably be taken to the United States Supreme Court, Gen. Butler having announced his willingness to manage the case for the people.

Fall of a Pot of Melted Steel.—The Pennsylvania Steel Works, at Steelton, Pa., was the scene of a frightful accident at 5 a. m. on April 15. While the men were at work where the steel is made the hatchet controlling the movement of the large vessel holding the molten metal broke. The retort turned upside down, and the contents were poured into the pit underneath, in and around which eight men were employed. George Yost and a man named Westbrooke were so badly burned that their lives are despaired of. Monroe Miller, Simon Martin, George Horning and one or two others were also badly burned.

The American double iron rope system has been adopted by the constructors of the railway up Mount Vesuvius. There are two lines of rails, each provided with a carriage divided into two compartments, and capable of holding six persons. While one carriage goes up the other comes down, thus establishing a counterpoise which considerably economizes the steam of the stationary traction engine. The incline is extremely steep, commencing at 40°, increasing to 63°, and continuing at 50° to the summit. Every possible precaution has been taken against accident, and the railway itself is protected against possible flows of lava by an enormous wall. The ascent will be made in eight or ten minutes. To obtain the necessary supply of water, large covered cisterns have been constructed, which in the Winter will be filled with snow that often falls heavily on Vesuvius. This snow will be quickly melted by the internal heat, and, besides the water thus obtained, the frequent rainfall will also be conducted into the cistern. An elegant cafe restaurant, capable of accommodating 100 persons, will be attached to the station. Above the entrance of the latter is an ample terrace supported on columns, whence an enchanting view is obtained not only of the Gulf of Naples, but also those of Baiae and Gaeta, each dotted with its islands.

A series of experiments on the electro-deposition of bismuth with various solutions of this metal, has recently been carried out in the laboratory of Mr. D. G. Fitzgerald. Sesquioxide of bismuth, dissolved in a hot solution of the double tartrate of soda and potash—Rochelle salt—was found to give excellent results at a temperature of about 160° F. The anode should be considerably larger than the cathode or article to be plated, and the electro-motive force should be between one and two volts. A perfectly adherent deposit of silvery luster, but of a darker color than silver and not liable to tarnish, may readily be obtained on iron or steel, copper and brass.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, April 22, 1880.

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One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months \$25.00; one year, \$40.00; payable in advance.

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The long-expected decision of Judge Blatchford in the case of the United Nickel Company vs. Pendleton, in which the defendant was charged with violating the injunction of the court in plating with nickel from an acid solution, was rendered yesterday. Judge Blatchford dismisses the complaint on the ground that, if plating from a solution of the single acetate of nickel be practicable, it does not infringe the Adams patent, "so that there is nothing to found an attachment for contempt, as there is no case for decision on the merits as to anything." Fuller information concerning the evidence and the import of the decision will be found elsewhere in our reading columns. This ends a long and bitter fight, and the victory is not this time with the United Nickel Company. Judge Blatchford does not seem to think that plating from an acetate solution is a practical process, but on this point he is mistaken. A great deal of practical plating on a large scale is now done with it, and the results are quite as good as were ever obtained in the double

sulphate solution, if not better. It deteriorates less rapidly and is cheaper in the end, although somewhat more costly at the outset, and gives a much quicker deposit than is obtained in the double-sulphate solution.

The Position of Iron.

In some editorial remarks in our issue of March 11 on "The Outlook for the Western Iron Trade," we ventured certain opinions to which our attention has since been called by friends who find satisfaction in reminding us that, in this instance at least, the views we expressed were not substantiated by the subsequent happenings. *Ex post facto* wisdom is the cheapest and most abundant kind of wisdom. The editorial to which we refer concluded as follows: "Another fact, which will have a decided effect on the price of bar iron, is the rapid working up of the pig iron bought at low prices. Most Western mills have had considerable stocks of \$16 to \$30 pig iron. This is disappearing. They have been working ore as a fix which cost \$7 to \$8 at Cleveland. When pig iron has to be bought at \$40 it will cause a different feeling as to the price of bars. When ore is received at furnaces and mills that costs \$12.50 at Cleveland, there will be no feeling of weakness on 4-cent iron."

This is the way it looked in the West at the date of the writing from which the above is quoted. How it looked in the East about the same time, may be judged from the letter of our always well-informed Philadelphia correspondent in the issue immediately preceding—that of March 4. We quote as follows from his letter of that date:

"The fact that foreign iron is being used quite largely for foundry purposes should not be lost sight of, however, as it cannot fail, in the long run, to have an important influence upon prices. In the meantime, values in this market have yielded very little, and for the present the chances seem to be in favor of higher prices at an early date. Certain it is that an active buying movement would lead to an immediate advance, as there are no stocks of any account, the leading furnaces being sold close up and for some time to come. A good deal now depends upon the condition of business in the West. Large shipments have been made in that direction, and if buyers from there come in again, it will probably be the turning point in the market. Considering the rapid advance in prices, it is remarkable how steady the market has been held. Comparatively speaking, very little iron has been sold at the high figures now quoted, and it will be an important step for consumers to make purchases at an advance of, say, \$10 per ton. Most of the iron now being used costs, probably, less than \$30, and if, as seems almost certain, the trade have to commence again in the neighborhood of \$40, it cannot fail to seriously influence values of all descriptions of iron manufacture. During the next two months a crisis of this kind will have to be passed, viz., the establishment of a new basis of values. That it will be done safely and easily seems pretty well assured, and for the present there is no apprehension in regard to the safety of the iron trade."

The fact that within ten days the situation changed, casts no discredit upon such utterances. The most that can be expected of a trade journal is that it shall correctly reflect, in its editorial columns and trade reports, the situation as it exists when its issue is printed. In critical conditions of the market prophecies are unsafe. Most of those who have ventured predictions regarding the course of iron have been mistaken, and all that we have ever attempted to do was to draw such inferences from the actual position and apparent tendency of the market as seemed to us fully warranted.

But the object of this editorial is neither explanation nor apology. We have printed nothing in our columns calling for the one or the other. Any one can tell this week much that no one could have foretold last week, and this is eminently true with regard to the iron market. We propose rather to consider the question whether, after all, and in view of everything that has since happened, the Western advance in bar iron to 4 cents was as great a mistake as many now appear to consider it. Did or did not the condition of affairs existing at the time this price was made justify the manufacturers in making it? Further, under similar circumstances, would it or would it not be well to do the same thing again? No one will venture to deny that in all the advances which have so far been made in the prices of goods since the world began, there has always been one too many, and that has invariably been the last one preceding a decline. At the present time, the claim is that the "one too many" in iron was the one made about the first of February, to 4 cents in the West, and 3.8 to 4 cents East. Had this not been made, would not the 3½-cent been the last one and the "one too many," or the 3 cent or the 2½-cent? In a word, would not any advance whatever have been the one too many? Some of our readers may reply that 4 cents is too much for iron at any time, and that 2½ to 3½ cents is about a fair price. Why is 2½ cents any fairer price of itself than 5½ cents or even 10 cents? Why is any price a fairer price than any other? On what principle can it be said that 2½ cents, for example, is a fairer price than, say, 1 cent in one direction and 4 cents in the other? There is but one rea-

son for any price, and that is, market or exchange value. If, under certain conditions, iron is in demand at 4 cents, that is a fair price at the time, and it is just this fact that justified the 4-cent card of the Western Iron Association. When the card was 3½ cents, large amounts of iron were sold at 3.75 to 4 cents, not because the manufacturers demanded these prices, but because buyers came to them and freely offered to pay them. This fact cannot be disputed. The books of the Western iron men will show this to be true. Such being the case, we fail to see that the manufacturers made a mistake in advancing the card to the selling price. After events may have compelled a retreat, as they did, but at the time the action was taken it was not considered improper or injudicious.

There is another fact which has an important bearing on the question under consideration. It was an honest move. Whether they were wise or not, the Western iron manufacturers had entered into an agreement to pay a large part of their skilled labor a price based on the price of iron. Technically, the wages were based on the card, and if the card had not been advanced wages would not have been increased; but to keep down the card for the purpose of keeping down wages, even if it was successful, was acting in bad faith, and it is questionable if the workmen would have allowed it. In this respect, at least, it was honest, and, as iron was selling above the card, it was wise in the light of the circumstances at the time it was done.

It is claimed, however, that it was unwise for two reasons. First, it caused certain projects that had been undertaken to fall through; and, second, the 4-cent card en-

couraged the importation of a large amount of English iron. It is a sufficient answer to these objections to say that the first of the effects charged to the 4-cent card is very much overrated, and that this is still more true of the second. Of course it is difficult to say how many projects were abandoned because the card was made to conform to the market price, but the indications are that most of those that have been seriously undertaken are progressing. Some that have been talked about may have been given up, but few for which preparations have been made will fall through, except in cases where railroad consolidations have stopped the construction of extensions and competing lines. The mileage thus withdrawn from the total in progress is, in the aggregate, considerable.

As to the 4-cent card leading to the importation of iron, the probability is that more iron was bought abroad when the card was 2½ or 3 cents than when it was 4 cents. Most of the iron now coming in was bought last December and January, and the 4-cent card was not adopted until Feb. 2. So if this argument is good for anything, it is as good against 3 cents as against 4 cents.

In all this we do not mean to say that events did not make it necessary to put the card back to 3 or 3.2 cents, but it does seem to us that all the circumstances at the time it was made justified the 4-cent card. In

the light of present knowledge it is easy to look at the matter as an unwise move, and to see why the price could not be sustained. To again advance the card to 4 cents would be the worst kind of mistake, as any one can see, but all the conditions have changed, and no one proposes such a thing at this time.

There is a very general disposition to blame the makers of both pig and manufactured iron, somewhat unjustly, for the causes which have brought about the existing condition of affairs. It seems to us that they adopted, very generally, a conservative policy, and that, if they made any mistake at all, it was in tying themselves up with contracts on an evidently rising market, and so putting it in the power of speculators and dealers to reap an advantage which properly belonged to the makers. It is notorious that at the best prices reached, very little iron was sold by the furnaces or the mills. By the time the furnaces were in a position to sell any considerable quantities of pig for prompt delivery, consumers were pretty well supplied with domestic and foreign iron. When the mills had completed deliveries on their earlier contracts, and were ready to take orders at the prices which had been obtained at second hands, dealers were well stocked up with domestic and English bars, bought at prices which enabled them to undersell the mills, and so prevented their getting many orders for anything which could be bought from store. As it seems to us, the makers followed, rather than led, the advance, and participated in the speculative operators and the brokers. As the rule, manufacturers neither felt nor expressed great confidence in the advance. It was too sudden and too suggestive of the danger of overproduction. The quality and stability of the consumptive demand had not been sufficiently tested, and the position of affairs in England did not warrant the hope that the quantity of iron which could be spared for this market would be within the limits of our requirements. For such iron as they had to sell, no one could expect the makers to ask less than it was worth, nor less than excited consumers were eager to buy it for. If makers, as a class, at any time became over-confident, it was not

until all the mischief for which they are now so generally blamed had been done—until materials, labor and other items of cost had advanced in a ratio disproportionate to the advance in selling prices of iron, and until they were, generally speaking, too late to profit by it in proportion to their expectations.

But be all this as it may, it is idle to blame anybody for the events which our trade reports have lately chronicled with such fidelity and detail. There are too many men interested in the iron business in one way or another, as makers, dealers and consumers, to make it possible that there should be any such thing as unity of well-considered and deliberate action among them. If prices go up, it is because causes are at work which favor an advance; if prices decline, it is because of the operation of causes which cannot be resisted. Individuals in the business do what seems best at the moment, and each is influenced to a greater or less extent by the opinions and actions of his neighbors and competitors. Thus confidence is strengthened or weakened; thus activity is stimulated into speculative excitement. Presently the more cautious and conservative of the trade begin to look closely into the actual situation, and others "hedge." Thus quietude follows great activity, and perhaps lapses into dullness. Whom shall we blame for all this? Why blame any one! Who, indeed, shall arrogate to himself the superior wisdom which will enable him to judge whether the great impulses that actuate the thousands of men who constitute what we call "the iron trade," and the tens of thousands whom we call "the consumers," were wise or foolish? How do we know that we have yet solved this perplexing riddle of the course of iron? Perhaps the outlook is not so dark as it seems. It may be that the recent elections and the resulting change of government in England will have the effect of creating confidence, and that, as the London *Economist* predicts, the British nation is "on the verge of another outburst of speculation." Should this prediction prove true, and capital put its shoulders to the wheels of the great enterprises and undertakings which are projected on the Continent of Europe, in Africa, in India, in the East, in South America and elsewhere, we may expect that a new life will thrill through the now feeble pulses of trade and a general revival follow. Under these circumstances, other and greater outlets than this country offers may be found, and prices advance to a point which would check exports hither without sacrifice on our part. A few months of active consumption, backed by confidence, would materially reduce the accumulations of foreign iron now held in this country, and the outlook for domestic producers would seem brighter than it has at any time since the advance last fall, because it would give promise of stability of prices and sustained activity of consumption. Whether this will happen or not we cannot tell, and one's views on this point would most likely be influenced by his feelings and interests. We predict nothing. Meanwhile, the reduction in the prices of domestic iron to approximate the level of quotations for competing foreign irons, was wise, because necessary. No one can claim much credit for having done this, for no one with domestic iron to sell could have sold it without making such concessions to the buyer, whatever his nominal quotations. If credit belongs anywhere, it is to *The Iron Age*. Months ago we pointed out the consequences to be expected from the large importations of foreign iron, and weeks before manufacturers reduced their quotations to meet importers' prices we urged them to do so.

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furnaces in blast than at any time since 1875, to which time our records of the 1st of April go back. A year ago this time the totals of in and out of blast were about reversed, 241 being in blast and 463 out of blast.

The relative condition of the blast furnaces of the country on the 1st of April for four years is as follows:

	NUMBER OF FURNACES IN BLAST, APRIL 1.	1877.	1878.	1879.	1880.
Charcoal		102	60		

ing to note that in some places steel rails are rolled down, in only one heat, from ingots. It is also worth remembering that the section of an ingot can be reduced in roughing down to less than 6 inches square or 4 inches flat, and that the number of times a steel bloom has been heated cannot be decided with any degree of certainty by an examination of the bloom or billet. But if the duty depends upon the size of the mass imported, all billets made for the American markets will hereafter be blooms.

But, so far as we are able to learn, the most important question raised by Judge French's decision making blooms dutiable at 45 per cent. ad valorem, still remains unanswered. In that decision the words "steel blooms" are repeatedly used, but the class of steel is not specified. Nowhere do we find that the ruling is intended to apply only to blooms of those grades of pneumatic and open-hearth steel intended to be used in the manufacture of rails. If it is only a question of size and dimensions in the cross section, it would be easy to make blooms of high grade tool steel, and enter them at 45 per cent. ad valorem. It is possible to make very high grades of steel in the converter, and equally possible to reduce the ingots of this grade of steel to blooms. We know of nothing in the rulings of the Treasury Department thus far which would place any obstacle in the way of such importations. In fact, the whole question has been muddled badly, and what is most needed just now is that the Secretary of the Treasury should find out just what he means by "a steel bloom," and say so.

A Startling Exhibit.

Mr. James M. Swank, secretary of the American Iron and Steel Association, has compiled, from official figures, the iron and steel exports from Great Britain to the United States, for March and the first three months of the current and two preceding years. Below we give the figures:

Articles.	Month of March.		Three Months.		
	1878.	1879.	1880.	1879.	1880.
Tons	Tons	Tons	Tons	Tons	Tons
Pig iron...	1,761	3,429	106,302	5,341	9,702 232,523
Old iron...	349	1,034	44,801	509	1,001 99,306
Steel...	368	557	5,625	1,187	1,432 11,125
Thin plates...	8,417	14,801	14,801	24,139	34,933 42,071
Hoops and sheets...	67	146	4,479	156	235 14,421
Bar angle, bars & rod...	504	524	10,482	1,626	715 23,827
Rails—iron and steel...	106	372	15,198	109	1,184 43,307
Total...	11,593	20,963	201,748	13,127	47,892 466,666

No comment on these figures would make them more significant or suggestive. A total importation from Great Britain alone of nearly 467,000 tons between the 1st of January and the present time, allowing for the transit of March shipments, is well calculated to startle the trade. It is some satisfaction to know that we have probably passed the worst of this inundation of foreign iron, and that the orders now going out are small compared with those of December, January and February. In this connection the remarks of Mr. W. E. S. Baker, at the Bar Iron Manufacturers' Conference, held in Philadelphia on the 14th inst., of which an account appears elsewhere in this issue, will be read with interest. Mr. Baker's estimate of the relation of cost to the selling price of domestic pig and bar iron in the East and West, are especially instructive. On such questions Mr. Baker has made himself an authority.

Taxation of Commercial Travelers.

In the United States Circuit Court of Nevada, Judge Sawyer has rendered a decision of much interest to commercial travelers, in which it is held that a State may impose a license tax upon traveling salesmen selling by sample or soliciting orders, without violating the provisions of the Constitution of the United States. The law in Nevada, passed in 1877, provides that "every traveling merchant, agent, drummer, or other person selling or offering to sell any goods, wares or merchandise of any kind to be delivered at some future time," or carrying samples and soliciting orders, shall get a license and pay twenty-five dollars a month for it; and provides that whoever sells or tries to sell in violation of the statute, shall be deemed guilty of a misdemeanor and liable to a fine of not less than fifty dollars nor more than five hundred dollars. A salesman traveling for a San Francisco house with samples of coffee and tea, was arrested under this law for doing business without license. His principals assumed the defense of the case, and it has been decided against them. The basis of the defense was that the legislature of Nevada had assumed a power which belonged only to Congress, under Section VIII, Article I, of the Constitution of the United States, of taxing inter-State commerce. The court decides that the Nevada law does not violate this or any other provision of the Constitution of the United States, inasmuch as the license fee is not a tax upon the merchandise sold or transferred from one State into another, but upon the privilege of doing business under the protection of the State laws; furthermore, as there is no discrimination, and citizens of Nevada are required to pay this same tax for a business license, the decree of the circuit court is held to be in harmony with a ruling by the United States Supreme Court, that the levying of an indiscriminate tax of this character is within the power of a State government. This is just where the question has stood for some time, and further circuit court decisions are not likely to have any value. Except where

it can be shown that the citizens of a State are not required to pay the same tax as is imposed upon travelers, there will be no grounds for a successful appeal to the Supreme Court from any of the circuits. Taxing trade by requiring business licenses where no valuable franchise is conferred by such license, is a mistake and a wrong, but the only way to remedy it will be found in educating public sentiment to an appreciation of the right of every man to earn his living without having to license first. In the case of trucks, drays, omnibuses, horse cars, &c., a license is proper. These vehicles enjoy, when licensed, a valuable franchise in the right to use the public streets for purposes of traffic. In this respect the tradesmen enjoys no more advantage than any other citizen, and, as every man does some kind of business, it is impossible to draw the line fairly when it is once begun to demand that licenses to do business shall be taken out. All laws which require tradesmen to pay a tax for the privilege of doing business are mistakes. The petty revenues thus derived do not compensate for the injustice done in those instances in which such a tax, however small, is out of all proportion to the value of the privilege conferred.

The Ways and Means Committee and the Tariff.—Assistant Secretary French's Letter on Bessemer Steel Rods.

WASHINGTON, D. C., April 21, 1880.

The circular of the Secretary of the Treasury respecting the duty to be imposed on hoop iron, was issued on Saturday, April 17, and collectors of customs and others interested were officially notified of the fact. The text of this circular was published in this correspondence of the 14th, and in advance of its signature and promulgation by the department. The point of the Secretary's decision, it will be remembered, and which formed the instructions to customs officers, was that "hoop iron merely cut to lengths and punched with more or less holes, is not thereby removed from the category of hoop iron, and the specific rates of duty imposed on hoop iron in schedule E of the Revised Statutes will hereafter be collected on the article specified." The free traders of the Committee on Ways and Means are much exercised over this action of the Secretary of the Treasury, evidently anticipating a further extension of time in which to secure the adoption of the sub-committee's bill by the general committee, and its report and passage by the house. Representative Tucker has outlined his new hoop-iron bill, which, after reciting the controversies which have grown out of the question whether hoop iron cut into lengths for the manufacture of hoops, and having holes punched in the end, should be classified as hoop iron or as a manufacture of iron not otherwise provided for, at an ad valorem rate of 35 per cent., and the department decisions and verdicts of juries, provides that all importations of hoop iron cut to lengths contracted for prior to March 12, and imported within the present calendar year, shall be admitted at the ad valorem rate of 35 per cent.

In a separate proposition, Representative Tucker provides for an absolute change in the statute from the specific rate, restored by the circular of the Secretary of the Treasury, to the ad valorem rate of 35 per cent., claimed by the importers, and to extend it to all hoop iron. On this proposition the Committee of Ways and Means stand as follows, according to their recorded votes: In favor of the proposition—Fernando Wood, of New York; John Randolph Tucker, of Virginia; William R. Morrison, of Illinois; R. G. Mills, of Texas; John G. Carlisle, of Kentucky, and William H. Felton, of Georgia—six, all Democrats. Against it—James Phelps, of Connecticut, a Democrat, and Republicans: James A. Garfield, of Ohio; William D. Kelley, of Pennsylvania; Omar D. Conger, of Michigan; William P. Frye, of Maine; Mark H. Dunnel—six. This article, however, is not yet voted. They do not appear to be in any of the forms of steel specified in the statute; and, in the opinion of the department, are not properly an article of steel partially manufactured in the sense in which that term is used in the law.

The department is therefore of opinion that they are entitled to entry at the duty of 30 per cent. ad valorem, under the provision in schedule E for steel in forms not otherwise provided for.

You will readjust the entry accordingly, and forward a certified statement for refund of the excess of duties exacted.

Very respectfully,

CONDITION OF THE BLAST FURNACES OF THE UNITED STATES, APRIL 1, 1880.

(Compiled for *The Iron Age*).

Location.	CHARCOAL.			ANTHRACITE.			BITUMINOUS OR COKE.		
	Total number of stacks.	Number reported in blast.	Capacity per week.	Total number of stacks.	Number reported in blast.	Capacity per week.	Total number of stacks.	Number reported in blast.	Capacity per week.
New England	16	9	630	7	450	1	1	180	0
New York	16	7	462	9	530	43	33	7,710	10
New Jersey							16	15	4,100
Pennsylvania	38	16	712	22	787		4	3	1,32
Lehigh Valley							48	45	12,044
Schuylkill Valley							50	41	7,650
Upper Susquehanna Valley							24	16	3,455
Lower Susquehanna Valley							39	31	4,275
Pittsburgh									
Allegheny Valley								15	12
Shenango Valley								8	1
Yough'eny Valley								31	18
Juniata and Conemaugh Valley								5	1,440
Maryland	15	9	570	6	222	4	4	520	0
Virginia	27	13	422	14	601	1	0	140	5
North Carolina	7	0		7	264			5	2
West Virginia	6	2	142	4	382			6	6
Ohio									
Mahoning Valley								17	14
Eastern, Central and Northern								21	16
Hocking Valley								12	10
Hanging Rock								16	10
Miscellaneous	30	11	730	19	1,241			3	0
Kentucky									
Hanging Rock	9	4	393	5	370			3	2
Western region and Miscellaneous	8	0		8	553			1	1
Tennessee	18	3	230	15	1,030			6	4
Georgia	8	2	225	6	213			3	3
Alabama	11	7	980	4	330			3	2
Indiana	1	0		1	140			3	3
Michigan	25	13	2,730	12	1,775			2	0
Wisconsin	11	6	616	5	675			3	3
Minnesota	1								
Missouri	10	0		10	1,764			8	5
Texas	1								
Utah	1								
Oregon	1								
Total	260	102	8,842	154	11,327	230	180	40,000	40
								7,030	206
								140	39,472
								66	14,232

cent. ad valorem duty on "so called Bessemer Steel Rods" imported for barbed wire fences.

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., April 10, 1880.

Collector of Customs, New York.—Sir: The department duly received your letter of the 22d ult., submitting the appeal of Mr. T. V. Allis from your assessment of duty at the rate of 45 per cent. ad valorem on certain so-called Bessemer steel rods, imported per steamer City of New York, Jan. 12, 1880.

The articles in question are flat bands of steel from about one-half to five-eighths of an inch wide, some having ribs on the edges and some having a rib in the middle, and are intended for use in the manufacture of barbed wire fences. They are produced from the ingot, much in the same manner as steel wire rods, and appear to be little, if any, further advanced in manufacture than that article.

While their primary use appears to be for making barbed fences, they are, it is understood, available for other purposes. They do not appear to be in any of the forms of steel specified in the statute; and, in the opinion of the department, are not properly an article of steel partially manufactured in the sense in which that term is used in the law.

The department is therefore of opinion that they are entitled to entry at the duty of 30 per cent. ad valorem, under the provision in schedule E for steel in forms not otherwise provided for.

Very respectfully,

H. F. FRENCH, Assistant Secretary.

Bar Iron Manufacturers' Conference.

PHILADELPHIA, April 17, 1880.

To the Editor of *The Iron Age*.—DEAR SIR: In response to recent invitations, delegates from the leading bar iron mills of the Atlantic States met in the parlor of the American Iron and Steel Association, Philadelphia, on Wednesday, April 14, 1880, to consider about the present extraordinary condition of the bar iron interest.

An Improved Audiphone.—Nature announces that Mr. Thomas Fletcher has found, after a long series of experiments with the audiphone, that the best material of which it can be made is birchwood veneer. It is cut into an oval disk, steamed and bent to a curve, and can then be conveniently held between the teeth, almost without consciousness of its presence.

M. Leon Chottee had an interview recently with Premier de Freycinet, and delivered to him a document setting forth that no action will be taken by the Congress of the United States respecting a treaty of commerce until France has made known her proposals on the subject.

Forty-two thousand tons of Cleveland pig were shipped from the port of Middlebury to the United States during the year 1879.

Special Notices.

SPECIAL BARGAINS IN HARDWARE.

Will offer this week some of the greatest bargains ever offered to the trade to reduce a large surplus stock, bought at 25 to 50 cents on the dollar. Note the following extreme low prices:

4000 doz. 6 pt. Milk Pans at \$1.00 per doz.

5000 doz. 2 qt. Pails at \$1.00 per doz.

2000 doz. pint Cups, 25 cents per doz.

2000 doz. 6 qt. Retinned Pans at 50 per cent. dis.

1000 tons Strap and T Hinges at 40 to 50.

50,000 gro. Scouring Pads at 50 per cent. dis.

5000 Fancy Iron Plates, worth \$1.50, for 75 cents.

5000 Fancy Iron Plates, worth \$1.50, for 75 cents.

1000 doz. Handled Axes for \$9.00 per doz., worth \$1.00.

1000 doz. Rim Locks and Knobs, worth \$4.25, for \$3.00.

Large stock of all kinds of Locks and Knobs, at 30 per cent. below market.

1500 gro. White Steel Tea Spoons at \$1.75 per gro.

1500 gro. White Picture Nails, at \$1.50 per gro.

Job lot Association Cutlery at 30 per cent. dis.

Lot of Hoes and Forks at 50 per cent. dis.

Lot of First Quality Plates, at 40 per cent. dis.

Lot of Russell & Erwin's Real Bronze Door Knobs, worth \$1.00 per doz., at \$8.00 per doz.

Job lot of 14000 lbs. of Cast Iron, at 40 per cent. dis.

5000 Novelty Clothes Wringers, \$8.00 per doz.

A few doz. Novelty Clothes Wringers, \$5.00 per doz.

Over 50,000 doz. Cast Iron Shears at 70 per cent. dis.

Job lot of 3 1/2 x 3 and 3 3/4 Ohio Butt Co.'s Silver Tipped Butts at 60 per cent. dis.

This is the cheapest place in the United States to buy Hardware.

A. W. WHEELER,
141 Lake St., Chicago, Ill.

Wanted,

A Pair of Upright Shears for Shearing Plate one-half and three-quarter in. thick.

Address, stating price,
LOCK BOX 893, Pittsburgh, Pa.

Hardware Shelving and Fixtures For Sale.

The undersigned, having bought the stock of the late C. F. Humes, Taunton, Mass., have on hand the complete shelving of the store. The store was fitted up about three years ago by Mr. Humes, Jr., who is well known throughout New England as the "model store." The shelving is conveniently arranged for the different sorts of goods in a retail hardware stock, and was put up entirely with screws, so that it can be taken down and erected elsewhere without the slightest injury. This presents an unusual opportunity for fitting up a store, one of the most elaborate, convenient, and well-arranged ever devised, and at half what it would cost now. Also for sale, 200 green Paper Boxes, with wood ends, thoroughly dried, adapted for every conceivable article of hardware, and fitted for above shelving.

BURDITT & WILLIAMS,
20 Dock Square, Boston.

COKE FOR SALE.

Fifty tons daily for one year, delivery commencing in part immediately, at Austen, W. Va., on B. & O. R. R., 8 miles east of Grafton. Quality first class for blast furnace, foundry or Bessemer purposes. Address C. S. HURD,
Boreel Building, 115 Broadway, N. Y. City.

A Woodruff & Beach Beam Engine,

Low pressure, 45-inch cylinder, 45-inch stroke, with fly-wheel pulley 20 feet diameter, 36-inch face, and

Four Tubular Boilers,
6 inches in diameter, 20 feet long, and all connections practically as good as new.

For sale by

The Geo. Place Machinery Agency,
121 Chambers and 103 Reade St.,
NEW YORK.

CUPOLA FOR SALE.

A Cupola of about 15 tons capacity—oblong in shape, and nearly new, with fixtures complete. Will sell cheap. Address

GREENAWALT BROS.,
Harrisburg, Pa.

ILLUSTRATED CATALOGUES

of my Patent

Bit Brace Wrench

are now ready. This tool possesses every advantage of the ordinary Bit Brace, and will also turn with rapidity Nuts and Bolts from $\frac{1}{2}$ to $1\frac{1}{2}$ inches.

Q. S. BACKUS,
102 Chambers St., New York.

FOR SALE.

A works completely equipped for the manufacture of Carriage Axles. Is well located in relation to coal and iron, also very accessible to market.

Address E. P. BULLARD,
34 Dey St., New York.

Special Notices.

BISSELL & WELLES, Auctioneers.

SPECIAL TRADE SALE

Hardware, Cutlery, French Tinned and Enamelled Ware, &c.

For the Spring of 1880.

We shall make, WITHOUT RESERVE, a large SPECIAL SALE of above goods on

Wednesday, Thursday and Friday, April 28th, 29th & 30th,

AT OUR SALESROOMS,

83 Chambers and 65 Reade Sts., N. Y.

First Day's Sale, Wednesday, April 28, at Ten o'clock a.m., will comprise a large line of SHELF and DRAWER HANDLES, comprising a large line of Edge Tools, Hatchets, Hammer, Nail and Drawer Locks, Dividers, Flat Plows, Hand and Panel Saws, Screws, Spring Hinges, also, 200 Dozen Cast and Wrought Butts, Reversible and Japanned Butts, Inside Blind Hinges, 500 Dozen Hand Cut Files, assorted kinds, Porcelain Door Knobs, Strap and T Hinges, Shovels and Spades, Horse Shoes, Hatchet and Sledge Handles, together with other kinds of goods too numerous to mention.

The Sale of Thursday, April 29th, will comprise a large line of House Furnishing Goods, Fire Pans, Coal Stoves, Shoveling Watering Pots, Mop Handles, Brushes, Wash Pans, White Oil, Scrub and Horse Brushes, also, Direct from the Manufacturer, 100 LOTS of Tinned and Enamelled Ware, Stamped Dish, Rinsing, Sauce and Milk Pans, Preserving Kettles, Wash Basins, Tea, Table and Basting Spoons, Plated and Iron Sieves, &c., &c.; also, large line of Britannia Tea and Table Spoons, 100 Dozen Scissors, Shears, Pocket Cutlery, &c., &c.

Friday, April 30th at 10 o'clock, THIRD SPRING SALE OF SECONDS, BY ORDER OF THE CUTLERY ASSOCIATION, COMPRISING FROM

12,000 to 20,000 Dozen TABLE CUTLERY, desirable patterns; in COCOA, EBONY and WHITE BONE; also, a good line of CARVER'S, BUTCHER KNIVES, SOLID STEEL PLATED KNIVES, 12 oz. Plate, &c., &c.

This Sale will be worthy the attention of the trade.

DON'T BUY

MACHINERY

of any kind

UNTIL YOU WRITE TO US

for our List No. 20, containing full description, with prices, of over 2000 New and Second-Hand Machines, such as

MACHINE TOOLS,

BLACKSMITH TOOLS,

WOODWORKING MACHINERY,

STATIONARY AND HORIZONTAL ENGINES AND BOILERS,

PORTABLE ENGINES,

HOISTING ENGINES,

CAR MACHINERY,

WATER WHEELS,

COTTON AND

WOOLEN MACHINERY,

SAWS,

STEAM PUMPS, &c., &c.

We offer the largest collection ever in the hands of ONE FIRM before, and at

PRICES FAR BELOW THEIR TRUE VALUE.

Enclose stamp and state fully just what Machine or Machines you are in want of. Address

S. C. FORSAITH & CO.,

MACHINISTS,

AND GENERAL MACHINE DEALERS,

MANCHESTER, N. H.

Machinery, Tools, Engines, &c., For Sale.

3 Column Drills; 4 Slide Lathes; Suspended Drill; two 50 h. p. Andrews Engines; 12x4, 10x20, 10x14, 8x12 Horizontal Engines; 5 Locomotive style Boilers; 10 h. p. Portable Engine, on wheels; Ingersoll Rock Drill; 45 Steam Pumps; 2 1/2, 3, 4 and 4 1/2 Inch Syphons; Hoisting Machinery.

Write for particulars.

A. G. BROOKS & WINEBRENER,
261 N. Third street, Philadelphia.

WANTED.—A situation by an Analytical and Chemical Chemist; age 33; experience 7 years practical in the manufacture of anthracite and Staffordshire pig iron, iron and steel; 2 years' practical in copper extraction and refining in Spain and England; 2 years in Dr. Hassall's Analytical Sanitary Institution, London, and 2 years in laboratory (own) for analyses of all kinds. For references and testimonials, address

FREDERICK M. CHADWICK,
Bergenport Chemical Works, Box 30,
Bergen Point, N. J.

For Sale to

J. H. DUNNING,
Deckertown, N. J.

FOR SALE.

Stock of Hardware, Stoves, Tinware, Tinner's Tools and Store Furniture, on account of the death of the owner. Sale positive; terms easy.

Apply to

J. H. DUNNING,
Deckertown, N. J.

FOR SALE.

Job Lots and Bankrupt Stocks Hardware.

Great bargains offered to the trade.

A. W. WHEELER,
141 Lake St., Chicago, Ill.

Special Notices.

E. S. Wheeler & Co.,

54 CLIFF ST.,

NEW YORK,

OFFER

SPECIAL INDUCEMENTS

IN

QUALITY AND PRICE

and

Scotch

Foundry

PIG IRON.

Just Published.

STEEL:

Its History, Manufacture, Properties, and Uses.

By J. S. JEANS,

Secretary of the Iron and Steel Institute.

Section I. *History of Steel:* Chap. 1. History of Steel; 2. Early History in England; 3. Progress of Invention; 4. History of Bessemer Process; 5. Siemens-Martin Process; 6. History of the Bessemer Process; 7. Steel in America; 8. Germany; 9. France; 10. Austria; 11. Russia; 12. Sweden; 13. Other Countries—Section II. *Manufacture of Steel:* Chap. 14. Cementation and other Methods; 15. Siemens-Martin Process; 16. Other Methods—Section III. *Chemical and Physical Properties of Steel:* Chap. 18. Phosphorus in Steel; 19. The Use of Manganes; 20. Sphagmite; 21. Phosphorus in Steel; 22. Silicon in Steel; 23. Metallic Strength of Steel; 24. Mechanical Tests of Steel; 25. Analysis of Steel; 26. Steel for Railways; 27. To Shipbuilding; 28. To Bridge Building; 29. To General Purposes; 30. Guns and Armor Plates; 31. Other Purposes.

Price.....\$14.50

For Sale by

DAVID WILLIAMS,
83 Reade St., New York.

JOHN R. WHITLEY & CO.,

European Representatives of First-Class American Houses,

WITH

FIRST-CLASS AGENTS

IN THE

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Special Notices.**Trustees' Sale of the Westminster Hematite Ore Bed
In Carroll County, Maryland.**

The property consists of 22 acres of land, within a short distance from the corporate limits of the City of Westminster. It contains very fine hematite ore which has been successfully worked and is now in condition to resume production at once. There is a switch extending from the Western Maryland Railroad directly to the mine, there being no road by which the furnace at Pennsylvania can be readily reached. Immediate possession will be given upon the purchaser complying with the terms of sale, which are, one third of the balance in six months, and the rest interest to be secured to the satisfaction of the Trustees.

The sale will be at Auction to the highest bidder, on Wednesday, the 26th day of April, 1880, at one o'clock P. M., at the furnace at Westminster.

THALEAS A. LINCHICUM, Trustee.

CHARLES E. ROBERTS, Trustee.

JOHN T. DIFFENBAUGH, Attorney.

For further particulars apply to J. R. KIRKSMAN, Executor, &c., 52 Broadway, New York.

For Sale.

Five hundred acres Gas and Coke Coal on line of B. & O. R. R. Connellsburg Branch, 38 miles from Pittsburgh. Quality unsurpassed. The only locality where pure Youghiogheny Gas Coal and Connellsburg Coke Coal are found in the same vein, but completely separated. One thousand acres less than three miles. Gas Coal seam 6 feet, Coke Coal seam 3 feet. Analysis of Coke gives 93 per cent. carbon, and less than 1 per cent. of ash. Will construct one to 300 ovens if desired, and have same ready to produce Coke by October 1st.

WAVERLY COAL & COKE C'Y., Pittsburgh, Pa., or H. C. BUGHMAN, 57 B'way New York.

For Sale.

Stock of Hardware, Stoves, Implements, Tinners' Tools and Stock, in South Western Iowa.

Address Office of the Iron Age, 83 Reade St., New York.

BLOWING ENGINE FOR SALE.

Air Cylinder, 4 ft. x 4 ft.: Steam Cylinder above. Address

CAMDEN IRON WORKS, Camden, N. J.

For Sale.

A lot of selected Second-hand Rails, suitable for relaying or for siding. For terms, apply to

JAS. W. BATCHELOR, No. 113 Water Street, Pittsburgh, Pa.

HAMMACHER & DELIUS, Hamburg, Germany, 62 Alter Wall,

Solicit correspondence with American Manufacturers and Inventors in regard to representation in European countries.

Splendid Investment.

The noted Carter's Furnace Iron property, in Carter county, East Tennessee, for sale; 1,000 acres, fine timber, land improvements and cheap machinery, water power, one five-ton cold blast charcoal furnace, best car wheel iron, now yielding large profit. Best New York and Tennessee references. For terms, address

HUNSDORF CARY, Room 32, No. 35 B'way, N. Y., or # Madison St., Memphis Tenn.

WANTED. Iron Planer, 36 x 36 in. x 8 feet. Pulley, 54 x 24 in., 3 in. bore. Machine Shop 5-ton Crane.

FOR SALE. 12 x 24 in. Engine, Fly Wheel 5 x 2 feet; been in use about two years. Can be seen running at THE STILES & PARKER PRESS CO., Middletown, Conn.

To Capitalists and others Seeking Manufacturing Sites.

The Parnassus, Pa., Industrial Association offers liberal inducements in land and cash to parties who will locate manufacturing establishments in their town. Coal, Gas, Coal and Iron Ore in immediate vicinity. Address PARNASSUS INDUSTRIAL ASSOCIATION, Parnassus, Westmoreland Co., Pa.

CRANES—THREE FOUNDRY AND TWO BLACK-IRON. Smith's Cranes for sale, low. R. FRAZIER, Agent, Bordentown, N. J.

BOILERS—HORIZONTAL AND TWO UPRIGHT. Second-hand Boilers for sale, very low. Also a 7 ft. Engine. R. FRAZIER, Agent, Bordentown, N. J.

TUG-BOAT, GEAR-WHEEL, AND PUMP PAT. Terms for sale at less than one-fourth cost. R. FRAZIER, Agent, Bordentown, N. J.

IRON SAFE FOR SALE IN GOOD CONDITION. Price \$30. R. FRAZIER, Agent, Bordentown, N. J.

FOR SALE, CHEAP.

One Horizontal Engine, about 14-horse power, early new; with Tubular Boiler, Blower, Hot Well, Steam Pump and everything complete. For particulars, apply to

L. B. CURTIS, Red Hook, N. Y.

WANTED.

A Large Facing and Boring Mill. Address

P. O., Camden, N. J.

FOR SALE, CHEAP.

A Second-Hand 5-horse-power Portable Engine and Boiler (Economizer, built by Porter Mfg. Co., Syracuse, N. Y.); nearly new and in perfect order. For particulars, call on or address

THE RENZ HARDWARE CO., Bridgeport, Conn.

WANTED, SITUATION.—A Western Hardware Man of long experience wants a situation to represent a manufacturing concern in the West and Far West. Address X. M. A., Care of office of The Iron Age, 83 Reade St., N. Y.

WANTED—Consignments of small Engines and Bolts, Steel, Cast Iron, Foot and Flywheel Lathes, and other desirable tools, at reasonable prices, on commission, by a responsible firm in New York, having a machinery store in first-class location. Address P. O. Box 1012, New York City.

**Special Notices.
FOR SALE.**

The Salisbury Iron Manufacturing Co., of Virginia situated near the village of The castle, in Botetourt County, Virginia. There are on the property at the Furnace, several Houses, a Grist Mill, Blacksmith Shop, Stables, &c., all of which are owned by the property. The furnace is in good order, having in the shed close to the furnace 100 bushels of Charcoal and 100 cords of Oak Wood, all stacked in cords on the property. The Ore Bed is four miles from the Furnace, and opened about 100 feet in the face of the mountain. Water is taken a mile on the side of the mountain in a flume, and falls down on the earth on the top of the ore bed, the mud and water falling through a creek into the James River. The ore in the bed is shoveled into a trough, or flume, with dipper buckets, and the bottom it is washed clean. Iron, acknowledged as good as the Salisbury for car wheels, has been made here for eight years, and sold for car wheels to different parties around New York, but principally to Whitney & Sons, of Philadelphia, and Boston & Co., of New Haven.

The property, besides having water communication with Lynchburg and Lexington, will have, within a few months, communication with the Chesapeake & Ohio R. R. at Clifton Forge, at this point our property is about 9 miles from Clifton Forge. A railroad is now being made from Buchanan to Clifton Forge, and runs along the James River, which has a part of the ore bed. The property owns 400 acres of land, 200 of which can and is partly used for farming, the other 200 acres is covered with large oak timber. Timber land can be had for a few dollars per acre, or the wood of a nominal price. The late Jacob Dakin was the Manager and half owner of the property. Since his death, in 1877, it has remained idle. If acceptable security be offered, no money for years will be required. It is offered for sale at a sacrifice by

EUGENE KELLY,

45 Exchange Place, New York, or by COL. PENDLETON, of Buchanan, Va.

NEW YORK, March 22, 1880.

A. J. STEINMAN, Chairman. W. B. MIDDLETON, Sup't. W. G. MENDINHALL, Sec'y & Treas.

OFFICE OF**PENN IRON COMPANY, Limited**

MANUFACTURERS OF

Merchant Bar Iron, Hammered and Rolled Axles, Car Forgings, Bridge Work, Fish Joints, Bolts, R. R. Spikes, Bolt Ends, &c., &c., LANCASTER, PA.

WANTED.

A Shear for splitting old rails lengthwise, with knives from 24 to 30 inches long. Address

PENN IRON CO., LIMITED, Lancaster, Penn.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address HARDWARE, Box 466, Salina, Kansas.

For Sale.

Engine and Boiler, 35-horse power. Shafting, Pulleys, &c. Steam Hoisting Apparatus. Also, a complete set of R. R. card making machinery.

Apply to GEORGE BAILEY, 299 Pearl street, Buffalo, N. Y.

NAILS FOR SALE.

A small quantity of well-known brands of cut nails, in lots and sizes to suit. State quantity and sizes wanted, and address

NAILS, Box, 1169, New Haven, Conn.

For Sale.

The valuable Iron Ore property of the Wayne County Mining Company, situated in Wayne Co., N. Y., on the line of Lake Shore division of Rome, Utica & Binghamton R. R., between tracks and branches leading to the mines. This property extends over four miles along said road, and nowhere over half a mile from it, and contains over two millions of tons. It is now in full operation and shipping from 100 to 1,000 tons per day, and is capable of doubling that amount. It is only 17 miles from port of Genesee, one of the best harbors on Lake Ontario, with ample dock room for shipping by lake. For further information, address

J. E. ELLIOTT, Sec'y Clinton, Oneida Co., N. Y.

DARTIES desiring to manufacture Fire Brick and Pottery can secure a location on the line of the Brightoppe Railway. Water abundant, fuel and material cheap. Freight to tide water, \$1.00 per ton; to Richmond and Petersburg, \$1.50 per ton. Good local demand. Product can be delivered on Chesapeake and Ohio, Richmond and Alleghany, and Atlantic Coast Line without breaking bulk.

JAMES R. WUTH, Sup't and Treas., Richmond, Va.

FOR SALE.

One Self-Acting Lathe, with compound slide rests and geared face plates; bed 15 ft. 6 in., swing 7 ft. 5 in. Also, one Chucking Lathe, geared face plate, swing 5 ft. to 1 in., heavy compound slide rests. Also, one Shifting Engine, standard gauge, two 6-inch cylinders, weight 1,000 lbs. Address

JOSEPH LUMLEY, 144 North Third St., Philadelphia, Pa.

A GENTS WANTED to sell to the Hardware Trade.

BROWNELL BROTHERS, Keokuk, Iowa.

WANTED—A situation as Traveling Salesman, by a young man acquainted with the Iron, Steel and Hardware trade, both East and West, and of good experience. He is also thoroughly familiar with office work. Salary moderate. Address EDMUND, P. O., Boston, Mass.

A GENTS WANTED to sell to the Hardware Trade.

Commission liberal and samples quite light. Address C. H. D., Office of The Iron Age, 83 Reade St., New York.

THE IRON AGE.**Trade Report.**

Office of THE IRON AGE, WEDNESDAY EVENING, April 21, 1880.

The week just closed has been one of moderate activity in financial circles. The proposals to sell United States bonds to the sinking fund were opened at the Sub-Treasury at noon to-day. The amount offered was \$4,667,250. The Secretary of the Treasury accepted \$3,000,000.

In the local money market the ruling rate for call loans has been 6 per cent. Occasional loans were made as high as 6 per cent., in addition to a commission of one-eighth of one per cent. per day, and as low as 3 per cent. per annum.

United States bonds have been strong. Railroad bonds were alternately strong and heavy, but prices generally declined. The largest transactions were in Erie second new consolidated, Iron Mountain issues, and Kansas and Texas issues.

In the stock market prices were alternately strong and weak, but, on the whole, declined. The greatest fluctuations occurred in Louisville and Nashville, Houston and Texas, and Nashville and Chattanooga. At the close the market was quiet. The principal dealings were in Erie, Wabash and Pacific, Iron Mountain, the coal stocks and the Wisconsin shares.

The bank return shows a gain of \$644,300 in reserve, which now stands at \$536,850 above, against \$4,483,950 at this time last year, and \$17,608,550 at the corresponding period in 1878. The loans show a loss this week of \$4,220,100, the specie is down \$1,972,800, the legal tenders are increased \$1,930,100, the deposits are down \$2,743,000, and the circulation is decreased \$144,900.

The following is an analysis of the bank totals of this week compared with that of last week:

April 10.	April 17.	Comparisons
Loans.....	\$28,470,900	\$26,220,800 Dec. 1, 1880.
Specie.....	\$2,02,000	\$0,50,800 Dec. 1, 1880.
Legal tend'r's	11,935,900	11,865,600 Dec. 1, 1880.
Total reserve	63,039,500	63,916,800 Dec. 1, 1880.
Deposits.....	256,267,800	253,519,800 Dec. 1, 1880.
Reserve re- quired.....	64,056,950	63,379,950 Dec. 1, 1880.
Reserve.....	107,450	93,850 Dec. 1, 1880.
Reserve.....	20,970,000	20,843,000 Dec. 1, 1880.

The foreign trade movements at the port of New York since our last issue are shown in the following tables:

IMPORTS.

For the week ended April 17:

	1878.	1879.	1880.
Dry goods.....	\$1,474,235	\$1,300,456	\$2,727,054
General mdse..	4,140,323	4,195,980	9,545,754
Total for week.....	\$5,614,558	\$5,495,036	\$12,273,781
Prev. reported.....	79,179,438	84,111,251	134,108,481

Since Jan. 1.....\$84,793,996 \$88,616,307 \$146,382,189

Included in the imports were items of merchandise valued as follows:

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended April 20:

	1878.	1879.	1880.

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BRITISH IRON MARKET.

[Special Report by Cable to The Iron Age.]

LONDON, Wednesday, April 21, 1880.

Scotch Pig.—During the week prices have fluctuated in both directions, with a tendency to lower figures, and the market is now drooping, with very little business doing. The decline since our last report has been 3/6 on Gartsherrie, 3/ on Coltness and Eglinton, and 2/6 on Glengarnock. The following are makers' prices to-day:

Gartsherrie.....	57/6
Coltness.....	59/
Glengarnock.....	57/6
Eglinton.....	54/

Manufactured Iron.—It without change to note, the market remaining quiet with a small business doing. We continue quotations of Best Staffordshire Bars at £2.

Steel Rails.—Are dull and prices nominal. We quote £3. 5/- @ £3. 5/- for ordinary sections.

Iron Rails.—Under a light demand values have still further receded. We quote Welsh, £7, a reduction on last week's figures of 5/- @ 15/-.

Old Rails.—The offerings are moderate and sales fair. Prices, however, are still weak. We quote Old T's, £5, a reduction of 5/-.

Scrap.—The unfavorable condition of the market still continues, the lack of business rendering quotations difficult. We quote Wrought, nominally, £5. 5/-.

IRON.

American Pig.—The Iron market is in a very unsettled condition, and quotations are so irregular that it is a difficult matter to say what prices would be charged for the different grades. A sale is reported of a prime brand of No. 2 Forge, 800 tons at \$25. We quote, nominally, Foundry No. 1, \$32; Foundry No. 2, \$29 @ \$30; Gray Forge, \$25 @ \$28.

Scotch Pig.—The condition of the market is much the same as when we last reported it. Prices are very irregular, and sales, in lots, amounting to nearly 500 tons, of Gartsherrie are reported at prices much below the cost of importation—these sales are generally considered to have been forced for prompt cash, and the prices obtained do not fairly represent the value of the Iron. We also hear of sales of between 400 and 500 tons Glengarnock, in lots, at \$26 @ \$27.50. The arrivals of foreign Pig during the week aggregate nearly 8000 tons, a large part of which has gone into store. We quote Eglinton, \$26; Coltness, \$28 @ \$29.50; Glengarnock, \$26 @ \$27.50, and Gartsherrie, \$27 @ \$28.

Rails.—We are unable to report any transactions either in Steel or Iron Rails during the week, and quote, nominally, Steel, \$70@ \$75, and Iron Rails, \$60 @ \$65.

Old Rails.—The imports continue large, and business is extremely dull, with prices very irregular. We quote, nominally, Old T's, \$33 @ \$35. Sales are reported of 2000 tons on private terms and 250 tons D. H., part due now and balance to arrive in about three weeks, at \$30, ex ship.

Scrap.—We quote No. 1 Wrought, from yard, \$35 @ \$36.

Manufactured Iron.—Foreign Bars continue to arrive very freely, and the stocks in store here are large and well assorted. The demand is light, but the prospect seems good for a fair business in sizes and shapes for building purposes, and the inquiry from this source is more active. The price of Bars from store is unsettled, the nominal price being 3.75, but sales have been made at 3.50 base.

METALS.

Copper.—Our market has been very quiet during the week, sales being restricted to 150,000 to 200,000 pounds Lake Superior at 21 1/4 @ 21 1/4. Baltimore nominally commands as much. Speculative lots, it would seem, are now out of the way. There is nothing new from England per cable. Various telegrams have dropped in from the West coast, going to show that the resumption of war operations by Chili on shore at and near Moquegua have thus far been crowned with complete success. While this has been the case, the Chilean squadron has begun the blockade of Callao, the port of the capital of Peru—Lima. At the latter place there was a panic; American double eagles were selling for 120 soles (Peruvian dollars), and some great Chilean victory was apparently all that was needed to put an end to the war which has now lasted 14 months, ruining Peru for half a century to come. The production of Copper in Chili has not suffered from it in the least, on the contrary it was more active than ever. Messrs. W. T. Sargent & Sons, London, write about Copper, under date of April 5, to the following effect: "Notwithstanding a very moderate charter of West Coast produce for the month of March, prices have seriously declined, say for the month, to the extent of nearly £7 per ton, and from the highest attained in January, more than £11 per ton. There is a slight increase in total of visible supplies, but taking into account the chartering in advance, and the fact that all the West Coast stocks—roughly computed at 15,000 tons—are now included in the visible supplies, we should say that the present price is very moderate." There is no change at New York in manufacturers of Copper. We

quote: Braziers' Copper, 34¢; Bolts, 34¢; Circles, 37¢, and Sheathing Copper, 32¢.

Tin.—Extreme stagnation still prevails, with prices steadily declining under the influence of lower prices abroad and but little demand here, while arrivals continue on a liberal scale. London declined with Straits Tin to £80, but since rallied to £82. Singapore cables \$26, and Penang \$25.50 per cwt. As we are still about 10% above the London market, there seems to be but little prospect of higher prices here. According to Messrs. Gilliland, Wood & Co., Singapore, the shipments from the Straits settlements to the United States were:

TOTAL TO FEBRUARY 28.		
Ficuls.		£ POUNDS.
1886.....	45,906	1874..... 8,802
1879.....	23,203	1873..... 5,877
1878.....	11,808	1872..... 9,048
1877.....	2,147	1871..... 7,246
1876.....	7,744	1870..... 2,155
1875.....	17,911	

Arrivals during week at New York have been 12,237 slabs Straits and 3161 slabs Australian, part of which sold to arrive, but most of it going into store. We quote at the close, large lots of Straits, 10 1/2¢; Australian, 10 1/2¢ @ 10 1/2¢; Billiton, 18 1/2¢ @ 18 1/2¢; English Refined, 10 1/2¢ @ 10 1/2¢; ditto Common, 10 1/2¢ @ 10 1/2¢, and Banca, 21 1/2¢ @ 21 1/2¢. The market closes unsettled and inactive. Messrs. W. T. Sargent & Sons, London, April 5, write as under: "A good deal has changed hands during the month; much has been transferred from somewhat weak, vacillating holders to strong hands. It must be confessed that a decline in Straits Tin from £102 to £87.10, coupled with the great improvement in the statistical position, invites the attention of investors. It seems established beyond reasonable doubt that the American consumption has increased to the rate of 12,000, perhaps even 14,000, tons per annum, while the European consumption is also expanding, and may safely be estimated at 20,000 tons per annum. To meet this requirement of from 32,000 to 34,000 tons of foreign Tin we may calculate as follows:

Tons.
Year's sale of Banca and Billiton about..... 8,000
Year's shipment of Straits..... 11,000
Year's shipment of Australian..... 8,500

Total..... 28,000

Assuming this to be correct, we may expect a decrease of stocks during the year to the amount of 5000 tons. At present the shipments from Australia for the first three months of this year are only 1727 tons, against 2300 same time last year, and the shipments from the Straits only 3000 tons, against 4000 tons same period last year, giving thereby, so far, no evidence of supplies exceeding what we have put down, and stocks and quantities afloat already show a very material decrease. European net deliveries have been, for the three months, 5144 tons, against 4741 tons, 4658 tons, 3855 tons, and 4603 tons, in the four previous years." Tin Plates.—Have been very heavy and dull. We quote at the close, large lines, ordinary brands, per box: Charcoal Bright, \$8.75 @ \$9.25; ditto Tin, \$7.50 @ \$8; Coke Tin, \$6 @ \$6.37 1/2, and ditto Terne, \$7.

Lead.—There has been but little demand, business being confined to small jobbing sales. We quote Common Domestic, 5.6¢ @ 5.75¢. Refined is also dull at 5.8¢ @ 6¢. Manufactures of Lead remain unchanged. We quote: Sheet Lead, 9¢; Pipe, 8 1/2¢; Tin-Lined Pipe, 15¢, and Block-Tin Pipe, 45¢, less the usual discount to dealers. The London report reads as under: "The price fell considerably during March; Spanish Soft, which stood at about £18. 5/-, on the 1st, was sold as low as £15. 10/-." The absence of demand for home purposes is the principal cause of the fall, but another is the pressure to realize by speculators, who buy with no intention of taking the Lead on arrival. There is a rather better tone, quotations being: English, £17; Spanish Soft, £16. 10/- @ £16. 15/-; Silver Lead, £16. We estimate the arrivals in March at about 6800 tons." The shipments of Lead from London and Liverpool to the East, for the first three months of this year, were as follows, as compared with the same periods of the two previous years:

1 Mos. Tons. 2 Mos. Tons. 3 Mos. Tons.

To Madras..... 1898..... 54 6 26

Calcutta..... 1898..... 172 97

Bombay..... 1898..... 102 59

China..... 3,624 1,780 1,892

Japan..... 572 79

Singapore and Penang..... 45 75

4,784 3,086 2,141

Nothing new has been reported from the other side per cable.

Spelter and Zinc.—The same listlessness alluded to in our last week's report has prevailed during the week under review, and Common Domestic remains 6 1/2¢ @ 6 1/2¢, Silesian being, at the same time, worth 6 1/2¢, as to brand. Sheet Zinc may be quoted at 7 1/2¢ @ 8¢.

Nickel.—The hurricane in New Caledonia is not calculated to facilitate the resumption of mining there. We quote prime American here steady at \$1.50.

Antimony.—Of Cookson, 50 casks have arrived, of which the greater part is being distributed, the rest being held at 23¢. Hallatt commands 10¢. The market is moderately active and steady.

OLD METALS, PAPER STOCK, &c.

The Old Metal market is very flat this week, and we note a general decline in prices. The Bag and Paper Stock market is completely demoralized, and our quotations in some instances are merely nominal. The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy.....	£ P. £. \$0.18
Copper Bottoms.....	15 0
Yellow Metal.....	20 0
Brass, heavy.....	12 0
Brass, light.....	10 0
Composition, heavy.....	15 0
Lead, heavy.....	04 1/2
Lead, Lead.....	04 1/2
Zinc.....	04 1/2 04 1/2
Pewter, No. 1.....	11 0
Pewter, No. 2.....	07 0
Wrought Iron.....	25 00
Light do.....	15 00

We quote: Braziers' Copper, 34¢; Bolts, 34¢; Circles, 37¢, and Sheathing Copper, 32¢.

The prices current for Rags, &c., are as follows:

Canvas, Linen.....	" 12.50 @
Machinery do.....	" 17.50 @
Grate Bars.....	" 7.50 @

The prices current for Rags, &c., are as follows:

Canvas, Linen.....	£ P. £. \$0.10
White Cotton, New.....	" 3.00
No. 2.....	" 3 1/2¢ @ 5¢
No. 1.....	" 3 1/2¢ @ 4¢
Seconds.....	" 2 1/2¢ @ 3¢
Soft Woollens.....	" 2 1/2¢ @ 3¢
Mixed Rags.....	" 2 1/2¢ @ 3¢
Gunny Bagging.....	" 2 1/2¢ @ 3¢
Jute Bagging.....	" 2 1/2¢ @ 3¢
Kentucky Bagging.....	" 2 1/2¢ @ 3¢
Book Stock.....	" 2 1/2¢ @ 3¢
Newspapers.....	" 2 1/2¢ @ 3¢
Waste Paper and Scraps.....	" 1 1/2¢ @ 2¢
Kentucky Bale Rope.....	" 1 1/2¢ @ 2¢

The prices current for Rags, &c., are as follows:

Canvas, Linen.....	£ P. £. \$0.10
White Cotton, New.....	" 3.00
No. 2.....	" 3 1/2¢ @ 5¢
No. 1.....	" 3 1/2¢ @ 4¢
Seconds.....	" 2 1/2¢ @ 3¢
Soft Woollens.....	" 2 1/2¢ @ 3¢
Mixed Rags.....	" 2 1/2¢ @ 3¢
Gunny Bagging.....	" 2 1/2¢ @ 3¢
Jute Bagging.....	" 2 1/2¢ @ 3¢
Book Stock.....	" 2 1/2¢ @ 3¢
Newspapers.....	" 2 1/2¢ @ 3¢
Waste Paper and Scraps.....	" 1 1/2¢ @ 2¢
Kentucky Bale Rope.....	" 1 1/2¢ @ 2¢

The prices current for Rags, &c., are as follows:

Canvas, Linen.....	£ P. £. \$0.10

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seems to be in foreign Irons, especially Bessemer, which is offered at \$28 @ \$30 without finding buyers. Quotations of American Iron are difficult to give, as there is no established value at present. Some ask \$34 for No. 1 Foundry, but we hear of \$30 in other cases. Gray Forge varies nearly as much, \$27 @ \$31 being quoted. Scotch and English Irons are entirely nominal, no business whatever having transpired so far as we can learn. Charcoal Iron, \$45 @ \$50.

Muck Bar.—The market is again lower, and there is no disposition to buy. Small sales were made at \$55 some days ago, but business cannot be done now unless at a material reduction. There is no demand, however.

Blooms.—There is no improvement in the demand, and prices are again lower. Cold-blast Charcoal Blooms are offered at \$50 @ \$62.50 per ton of 2464 lb.; run-out Anthracite, \$75 @ \$77.50; Sunken Scrap Blooms, per ton of 2400 lb., \$65; Northern Ore Blooms, \$60.

Structural Iron.—There are no signs of immediate improvement, although there have been some inquiries, but not for lots of special importance. It is believed that a good deal of work will be done during the summer, but manufacturers are a little anxious to secure immediate orders. Contracts entered some time ago are nearly completed, hence the desire to fill up anew. Prices are very irregular and inclined to weakness, asking for Angles, 3.5¢ @ 3.5¢; Beams, Channels and Tees, 3.75¢ @ 4¢.

Plate and Tank Iron.—The market is very dull, and in the competition to secure business prices have been cut quite sharply. It is impossible to quote with exactness; some who are nearly through with their orders appear anxious for bids, but in a general way the following are the usual quotations: Tank and Common Plates, 3.5¢ @ 3.5¢; C. No. 1, 3.75¢; C. H. No. 1 Shell, 4¢; Flange, 5.5¢; Best Flange, 6¢; Fire-Box, 6.5¢; Solid Bloom, 8¢ @ 8.5¢. We are just advised of a sale of 600 tons heavy Plates, on private terms; also 800 tons of Skelp.

Sheet Iron.—Business is still dull, but during the past day or two there has been more inquiry, and at the decline in prices a more active demand may be anticipated. We note sales of two or three lots for shipment direct to Japan, which it is hoped will develop into a regular business. We make change in quotations, which fairly represent the market, as follows:

Common Sheet, No. 26 to 28.....	5.5¢
Common Sheet, No. 22 to 25.....	5.5¢
Common Sheet, No. 16 to 21.....	5.5¢
Best Refined 1/2¢ @ 1/2¢ advance on the above.	
Best Bloom Sheets, No. 26 to 28.....	7.5¢
Best Bloom Sheets, No. 22 to 25.....	7.5¢
Best Bloom Sheets, No. 16 to 21.....	7.5¢
Common Bloom Plate, 3.5¢ to 10.....	3.5¢
Estimated, 1¢ to 1.5¢.....	4¢
Best Bloom Galvanized, discount.....	20¢
Second quality, discount.....	20¢

Bar Iron.—The market is very much depressed, and it is almost impossible to secure orders of any amount. The recent decline has unsettled business a good deal, and unless parties are in immediate need they show no disposition to buy. Consumption is large, however, and it is expected that the demand will set in again shortly, as stocks are very much reduced. There is already an active demand for odd sizes, which are taken to make up an assortment, and it is believed that both consumers and dealers will be in the market at an early date. The large purchases made by consumers in December and January have enabled them to run along without purchasing much of late, but the enormous demand for all manufactured articles into which Iron enters is rapidly eating up supplies, which it is believed must be renewed in course of the coming month. The manufacturers report very little inquiry at present, however, and in many cases we hear of mills being shut down or run on part time only. Prices are unsettled, and, although 3.25¢ is quoted, we have reason to believe that good orders could be placed at about 3¢.

Steel Rails.—There is no change of importance. Prices are fairly steady, and sales have been made at about the same figures as quoted last week. Foreign Rails are easier, and we hear of several thousand tons sold from second hands at about \$70. American Rails have been sold at \$75 at mill. Transactions all told, so far as we can learn, amount to about 15,000 tons for the week. The market may be quoted quiet and steady at the above figures.

Iron Rails.—There is a very active inquiry, and it is believed that orders to a considerable amount will have to be placed before the end of the month. Manufacturers are anxious for business, and make every effort to meet buyers' views; but concessions seem to give the impression that still better terms may be made hereafter, hence no business has been definitely closed for some time past. The mills are pretty well through with old contracts, and sellers lose no opportunity of getting in their work. Prices are irregular, but \$56, at mill, may be regarded as an inside quotation for ordinary sections.

Old Rails.—With increasing anxiety on the part of holders to realize, prices have receded still further, the market closing weak at lowest quotations. Sales have been made at \$35 @ \$36 for small lots, but buyers cannot be found to-day at the lowest quotations, and we doubt if \$34 would induce a purchase unless from some one in immediate need. Very much lower prices are mentioned, but no one seems inclined to buy, so that prices may be considered entirely nominal at about \$35.

Scrap Iron.—Sympathizes with other articles and is lower. Cast may be quoted at \$24 @ \$26; Wrought, \$33 @ \$35.

Nails.—Are lower, and quoted at \$5, less usual trade discount.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, Pittsburgh, Pa., April 20, 1880.

The unsettled and unsatisfactory condition of the Iron business has a depressing influence on other departments of trade, nearly all of which are more or less dependent upon the former; hence an improvement in that great interest is anxiously looked for.

Pig Iron.—There has been very little change in the situation since the date of our

last report; business continues distressingly dull; the market is badly demoralized, and values are weak, with no foundation. Offers are being made to sell good native Iron at a decline of \$8 to \$10 per ton, as compared with the highest point, but there is no demand; the lower the price the more determined, apparently, are buyers to hold off. Those furnaces having contracted for Lake Superior Ore at the advance for the year, as some of them have, are in an unpleasant position, as the prices quoted now do not cover actual cost of production, and, at the moment, the tendency is still downward. It is thought by some that the Lake Ore companies will not attempt, in view of the turn of the Pig Iron market, to hold furnacemen to the highest price for Ore—\$12.50—on the dock at Cleveland, but that they will make a reduction sufficient to meet the shrinkage in Pig Iron; if they do not, it is intimated that some of the buyers will not be able to receive the Ore. Moreover, such a course would have a tendency to estrange furnacemen from the Ore companies in question, as well as to hurry up the development of new Ore fields nearer home, and to largely curtail the consumption of Lake Ores in this section of the country. It looks now as if Forge Irons were destined to settle within the range of \$25 @ \$30, 4 mos., and Bessemer at \$33 @ \$35. It is doubtful whether any could, as yet, be bought here within the range noted, especially of well-established brands; but, at the same time, it is equally as doubtful whether buyers could be found at the outside quotations in the present unsettled condition of the market. A small lot of Forge Iron was bought the other day at a decline of \$12.50 per ton, as compared with what the same Iron, out of the same pile, sold at before the full set in. However, the offerings of local Irons and Irons made west of here are light, sellers realizing the situation that the more there is pressed on the market the more it will become demoralized.

Manufactured Iron.—The market for Manufactured Iron continues very dull. The recent reduction in the card has not as yet stimulated the demand, as expected. Orders are coming forward very sparingly, and it is rumored that prices are lower at some of the leading points of distribution in the West, Chicago in particular, than they are here. Some of our manufacturers complain that they are having more or less trouble with buyers who bought during the excitement, when prices were higher than they are now. The latter are, when it is possible, canceling their orders or asking the manufacturers to extend the time of delivery, in hopes there will be a change for the better in the meantime. The business is in an exceedingly unsatisfactory condition for the millman, as in addition to the depression, buyers who contracted while prices were up do not feel like taking the Iron unless at a reduction; and we hear of rejections having been made, ostensibly because the Iron was defective in quality, whereas the real trouble was the parties did not want it at all, and adopted this little bit of strategy in order to wiggle out of their contracts. It is pretty certain, however, that if the price had gone up the manufacturer would have been obliged to deliver the last pound, and the consequence is that some of the latter will book orders hereafter with the explicit understanding that they are to have market price at time of delivery, whatever that may be.

Nails.—At a regular meeting of the Western Nail Association last Wednesday, as advised by telegraph, it was agreed to prolong the suspension of the factories two weeks longer, by which time it is expected there will be considerable inquiry, as it is hoped that stocks in hands, both of jobbers and speculators, will have been pretty well exhausted. That business has been dull this spring with manufacturers not to be wondered at when the fact is taken into consideration that large purchases were made during the winter, both by jobbers and speculators, and as they were made before prices got up to the present point, they can be sold under the highest card and make money for their owners. There has been a disposition in some quarters to find fault with the Nail men for prolonging the suspension of the factories, but by those who comprehend the situation, the action is considered wise and judicious, and if it had not been adopted and adhered to, this important interest, there is every reason to believe, would be in a worse condition to-day than at any time since the panic. While the card remains unchanged, sales are being made by jobbers at from 15¢ @ 25¢ per kg, under the card.

Railway Supplies.—The inquiry is light; buyers are holding off in anticipation of lower prices, but the probability is that there will be considerable inquiry within the next few weeks, as not only will some of the old roads be obliged to replenish stock, but quite a number of new ones are contemplated, and will be commenced this summer, notwithstanding the bottom appears to have been knocked out of the boom. No recent sales of Steel Rails are reported here. It is reported that some of the contracts of the Vulcan Works, of St. Louis, which have been shut down owing to labor troubles, have been transferred to Pittsburgh. Railway Spikes have been reduced to 4¢, 30 days.

Wrought Iron Pipe.—Prices continue weak and irregular. That there will be a large business this summer and fall is generally admitted, and once there is a reasonable probability of hard-han having been reached, orders will, no doubt, come forward freely. Discount on Steam and Gas Pipe, 50%; Boiler Tubes, 25%; Oil-Well Casing and Tubing, 10%.

Muck Bar.—The stock is accumulating; some of the mills have been "piling" up for some weeks past getting ready for the summer, when "hot dollar" goes on. There have been no sales reported for some time past, hence we are without quotations, but it is certain that concessions corresponding with that in Fig Iron would have to be made in order to effect sales.

Steel.—While orders are not coming forward so freely, the mills are still busy working up former contracts, and the outlook is favorable for a good summer trade. No recent change in prices.

Scrap.—The demand for all kinds of Scrap Iron continues light, and prices are weak and so irregular that it is difficult to give quotations. No. 1 Wrought nominal at \$39 @ \$40 per net ton, and Old Car Wheels, \$40 @ \$45 gross.

Window Glass.—Business keeps up well, and prices are fully maintained. Discounts for car-load lots, 50% on single and 60% on double strength, and 40 and 10% on single in a jobbing way.

Coal.—Owing to the suspension of navigation, the water in the river being too low to move Coal, thereby shutting off the supply, the down-river markets have stiffened up, and, in the absence of a rise, an advance both at Cincinnati and Louisville within the next few weeks is probable. The Southern markets are pretty well stocked, and Cincinnati, Louisville, St. Louis and other points have not anything like a summer's supply.

Coke.—The market has, as was to be expected, weakened in sympathy with Pig Iron, and prices, especially for future delivery, are lower. We continue to quote at \$4.25 @ \$4.50 per ton, on cars at ovens, for small lots for immediate delivery. We are cognizant of an offer having been made within the past week to sell a lot of a thousand tons for future delivery at \$4, and it was declined. That there should be a turn backward is quite natural, in view of a large and increasing production and a diminished consumption.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., Chattanooga, April 19, 1880.

Business in manufactured articles in this district has been in an unsettled and unsatisfactory state during the past week. The market has been so unsteady that buyers are led to expect a further decline, while holders are unwilling to make concessions on contracts for future delivery. Furnacemen and other holders of material are not as yet decided where they will have to stick their stakes, a matter which must of course be finally determined by the course of the Northern market.

Pig Iron.—Sales have been made at quotations, though many who control stocks are holding off. We quote: Coke and Charcoal Foundry, \$32 @ \$34; Gray Forge, \$27 @ \$28; White and Mottled, \$26. Cast Wheel Metal has been less affected than any other brand, and we continue to standard at \$40 @ \$45.

Muck Bar, &c.—No Muck Bar in market. The mills are still pretty full of Scrap of all kinds, and the managers are using it up while they wait for Pig to regain steady prices. Wrought is nominal at \$20 @ \$25, and almost nothing doing in it; Old Rails, \$32 @ \$34, and not much sought; Cast Scrap, \$12 @ \$15, according to make; Old Car Wheels, \$22 @ \$24.

Ores.—The market is abundantly supplied.

We have no change to note. Brown Hematite, 50 @ 56% per ton, \$2 @ \$2.75 per ton; Red Fossil, \$2 @ \$2.25, on cars or on wharf from flat boats.

Nails.—The price is being cut at various points by Northern holders endeavoring to unload in this district. Our local mills will probably be able to resume the Western Association card by May 1 on a reasonably strong market.

Manufactured Iron.—The lower grades of finished Iron have sympathized most with the sharp fall in Fig Scrap and Old Rails. We quote Bars at \$3.50; Railroad Spikes, \$4; Track Bolts, \$4.75; Trestle Bolts, \$4.75; Fish Plate, \$3.25.

Coal.—Coal is in full supply, with a fairly strong market. Manufacturers pay \$1.62 1/2 @ \$1.75 per ton for run of mine as per quality, delivered in cars in the mill yards. Lump is dull at 10¢, delivered.

Coke.—The demand for Coke is fully up to the supply, and makers are taxed to their utmost to meet orders. We quote at \$3 per ton at Furnaces; Foundry Coke, 10¢ @ 12¢.

Steel and Iron Rails.—There has been little doing of late in either. Light T is worth \$70 @ \$75, and there is some demand for it. Heavy Iron Rails, \$60 @ \$65, nominal; Steel, \$78 @ \$80.

BOSTON.

APRIL 17.—The Iron market continues dull and weak, but we are unable to find that the bottom has dropped out of it to the extent that has been intimated in some quarters the past week. The principal event has been the reduction of prices of Forge Iron by the Glendon and Andover companies to \$30 at furnace. This price would be equal to \$31.50 at tide-water; and on that basis a fair quotation for No. 1 Foundry Iron would be \$33 @ \$34. But local agents and brokers do not seem to be able to buy much iron at those figures. Even the Glendon and Andover companies appear to have very little iron to sell, and none in fact for April delivery. In the absence of much demand, and in the midst of the present unsettled feeling, prices show a wide range, and we quote American Pig Iron, f. o. b., at the shipping port, at \$34 @ \$37 for No. 1 X; \$33 @ \$36 for No. 2 X, and \$31 @ \$34 for Gray Forge. It makes little difference what figures may be quoted; they must be reduced until the market is free from outside competition, and until that is accomplished there can be no permanent improvement. The capacity for production is equal to consumption, and every ton of Iron imported is now so much in excess of requirements. This seems to be generally admitted, and in all departments of the trade there are evidences of a determination to accept the situation. Prices of ore and other items of cost are in process of readjustment, and it is probable that all the Iron required will be furnished at a fair margin of profit, without having resort to foreign markets. The immediate effect of this settling down process is a temporary curtailment of business, extending along the whole line. Dealers and consumers are waiting to see what the outcome will be, although postponements of purchases causes an uneasiness and inactivity quite out of keeping with the real condition of business. In course of a week or two the market will probably have assumed some definite character, but in the meantime it would be very

unsafe to make predictions. The imports of foreign Iron at this port the past week have been about 1800 tons. The latest cable dispatches report the English and Scotch markets dull and unsettled. We quote Scotch Pig in round parcels here in Boston at \$26 for Eglington; \$27 for Gartsherrie and \$28 for Coltness. For smaller lots to foundrymen, \$1.50 additional would be asked, or say \$27.50 @ \$28 for Eglington; \$28.50 @ \$29 for Gartsherrie, and \$29.50 @ \$30 for

summers will not listen to buying at any price, and seem determined to hold off until the last moment, in hopes of lower prices.

The stock of Iron on hand is small, and that at furnaces for sale is also slight. We think any considerable inquiry would cause a sharp advance in prices; but if the dullness continues longer it may go still lower before the reaction comes. We revise quotations as below:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal \$37.00 @ 40.00

No. 2 " " 35.00 @ 37.00

No. 1 Southern, Charcoal 36.00 @ 37.00

No. 2 " " 34.00 @ 35.00

No. 1 Hanging Rock, Stonecoal and Coke 36.00 @ 37.00

No. 2 Hanging Rock, Stonecoal and Coke 34.00 @ 35.00

No. 1 Southern, Stonecoal and Coke 35.00 @ 37.00

No. 2 " " 34.00 @ 35.00

No. 1 Missouri and Indiana Red-short and Neutral 31.00 @ 33.00

No. 2 White and Mottled, Cold-short and Neutral 30.00 @ 30.00

MILL IRONS.

No. 1 Charcoal Cold-short and Neutral 34.00 @ 35.00

No. 2 Stonecoal and Coke, Cold-short and Neutral 31.00 @ 33.00

No. 1 Stonecoal and Coke, Cold-short and Neutral 31.00 @ 32.00

No. 1 Missouri and Indiana Red-short and Neutral 30.00 @ 30.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast 55.00 @ 60.00

Alabama and Georgia, Cold-blast 55.00 @ 57.00

Kentucky, Cold-blast 46.00 @ 52.00

W. B. BELKNAP & Co., Iron and Steel merchants, Nos. 113 and 115 West Main street, report to us as follows, under date of April 17: The market still continues weak, and there is open cutting of prices on all sides. As we wrote before, 3.20¢ is merely nominal, and means, in present instance, that manufacturers would be very glad to get that figure for their product; 3¢ is nearer the wholesale selling price, though we doubt if the makers could place any considerable lots at that. A feeling of distrust is prevalent, and stocks must be run out before there can be anything like strength to the market. Buyers who listened to the specious arguments of an "Ore famine," of the "absolute inadaptability of foreign Iron to American wants," of the "limitless railroad demand which all the factories in the country could not supply," are wondering at the sudden change. Some operators who planned

PATENT DECISION.

Hardware dealers will please take notice of the decree of Judge Lowell, of the United States Circuit Court, in the case of Millers Falls Company against Quimby S. Backus, for infringement of Bit Brace Patents, which decree was in favor of the Millers Falls Company. The full text of the opinion may be found on page 11 of *The Iron Age*, of date December 18, 1879.

We have now obtained three separate decrees against three different manufacturers, and shall continue to prosecute all infringers. When the manufacturers are able to pay the damages we shall in no case trouble dealers, but when manufacturers are unable to pay we must ask the dealers to remunerate us, else responsible dealers might combine with irresponsible makers to render worthless the most valuable patents. Any reasonable man can see the point, and we have before given all dealers sufficient notice.

MILLERS FALLS CO.,
74 Chambers street, New York.

HEATON & DENCKLA, Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKES "Anchor Brand" Nails, Brads, Spikes, &c. MALLORY, WHEELER & CO.'s Door and Pad Locks. UNION MANUFACTURING CO.'s Butts, AMERICAN SCREW CO.'s Screws. D. R. BARTON TOOL CO.'s Edge Tools, &c. FRANCE'S Shutter Holders. Anti-Window Rattlers, Brass and Nickel-Plated. WESTERN FILE CO.'s Cast-Steel Files. AMERICAN SHEAR CO.'s Shears and Scissors. H. M. MYERS & CO.'s Shovels, Spades and Scoops.

Also a large line of Heavy and Shelf Hardware.

F. HABERMAN,

MANUFACTURER OF

Stamped, Japanned and Plain

TINWARE,

AND THE CHEAPEST AND BEST

OIL AND GAS STOVES IN THE MARKET.

NOTE.—These Stoves are made under license from the Kerosene Lamp Heater Co., the royalties are paid by me, and the Stoves have license tags attached, so that dealers may purchase and sell them with perfect safety.

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ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship off: they are very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

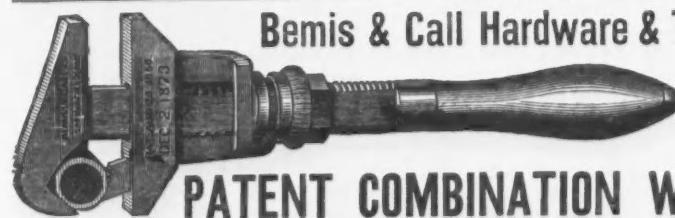
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Bemis & Call Hardware & Tool Co.



PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a combination which has no equal.

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NORWAY IRON FANCY HEAD BOLTS,
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Iron and Steel Rails,
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Pig Iron & Puddled Bars.

Old Reels, Scrap Iron, Steel Rail Ends
c. f. i. American, or f. o. b. European ports.
Contracts negotiated on the most favorable terms.
Bankers: Barnetts, Hoares & Co., London.

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SCALES
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"DRAW CUT"
BUTCHERS' MACHINES.
Choppers, Hand and Power
Stuffers,
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Warranted thoroughly made
and the best in use.
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Manufacturer of
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Tea Pots.
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Send for Price List.

Established in 1839.

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L. COES & CO.
Manufacturers of L. Coes'
GENUINE IMPROVED
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Wide Bar Full Length.
Wide Bar Full Length.

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The back thrust when in use borne by the SHANK instead of the Handle
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The 1880 Pennsylvania Lawn Mower

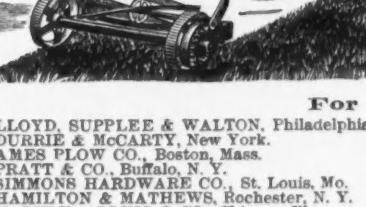
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LIGHT DRAFT AND EASILY ADJUSTED.

Every Machine Warranted to Work as Represented.

Points Claimed as being Meritorious:
Lightness combined with Strength in construction
It cuts easily.
It will cut long grass.
It is more durable.
It requires less repairs.
It cuts the grass more smoothly.
The attractive appearance of the machine.
It is the lightest machine in use, and all that is necessary to satisfy our customers of its superiority is to place it in competition with any other machine in the town in which they may reside.

Width of Cutter.	Style.	Driving Wheels.	Power required.	Weight.	Price.
10 inch.	8 "	8 inch.	A Child.	30 1/2 lbs.	\$14.00
12 "	8 "	8 "	A Lad.	33 1/2 "	18.00
14 "	8 "	8 "	A Lady.	35 "	20.00
16 "	8 "	8 "	One Man Size.	38 "	22.00
18 "	8 "	8 "		41 "	24.00



NEW MACHINES,

For Cutting Long Grass
15 inch, 10 1/2 inch Driving Wheels, 6 1/2 inch
Cylinder, Man Size, 48 lbs. \$23.00
17 inch, 10 1/2 inch Driving Wheels, 6 1/2 inch
Cylinder, Man Size, 51 lbs. 25.00

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THE NEW "CHARTER OAK" LAWN MOWER.

The most beautiful and perfect Lawn Mower in the world. It stands to-day at the head of the list of Lawn Mowers in the United States and Europe. It is mounted on two large driving wheels or pulleys, and instead of being on the outside of the frames, to run in the uncut grass, they are placed inside the frames, back of the cutting-blades, running on a shaft, each independent of the other, allowing the machine to be turned either to the right or left, according to the convenience of the operator, and to be turned around in a circle so greater than its own length and cutting at the same time. Those desiring a perfect Lawn Mower will find the "CHARTER OAK" far superior to any other. It is more durable, easier to adjust, operate and keep in order, and the driving wheels being inside the frames, enables the operator to cut the grass clean around walks, drives, flower-beds, trees and shrubbery.

Manufactured in Five Sizes.
8-inch, 10-inch, 12-inch, 15-inch (standard)
18-inch.

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HUNTER'S ROTARY SIFTERS.

Mixer, Scoop, Measure, Weigher, Egg Beater, Rice Washer, Tomato, Pumpkin, Starch, Wine and Fruit Strainer.

The greatest combination known, and pronounced by press and public the only sifter which saves more material than all other sifters. Made better by being rotated much faster, and costs less. Liberal discount to the trade. Please mention this paper, and send for illustrated Price List.

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KRUG & BLEIER, Screw Drivers, Gas Pliers, Cold Chisels, Box Openers, Cotton Hooks, Nail Sets, &c.

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Recommended as the best Hand Clipper made.

\$3.25 EACH.

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and Index to Advertisements.

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Tucker & Dugan, Indianapolis, Ind.	10
Anti-Friction Metals.	38
Geoff. Paul S., Philadelphia.	38
Anvils, Manufacturers of.	34
Fisher & Norris, Trenton, N. J.	34
Architectural Iron Work.	6
Attna Iron Co., 65 Goerck, N. Y.	6
Chamberlin E. K. & Co., Cleveland, O.	6
Asbestos Materials.	27
The Chalmers-Spence Co., Foot 9th st., E. R., N. Y.	27
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Meriam & Morgan Paraffine Co., Cleveland, O.	31
Axes, Spikes, &c., Manufacturers of.	8
Cook Bros., Winsted, Conn.	8
Hochstet Guy C. Field & Co., 622 E. 14th, N. Y.	33
Lambertville Iron Works, Lambertville, N. J.	7
Sheldon & Co., Auburn, N. Y.	7
Babbitt Metal.	31
Philadelphia Smelting Co., 12th and Noble, Phila.	31
Bag Holder.	32
Sprengle L. Jeff., Ashland, Ohio.	32
Barb Wire.	11
Scott H. B. & Co., Buffalo, N. Y.	11
Bed Screws.	30
Shelton & Co., Birmingham, Ct.	30
Bellow Manufacturers of.	23
Scott Geo. M., Chicago, Ill.	23
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Bevin Bros. Mfg. Co., Easthampton, Conn.	32
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Brownine, Slurm & Co., 84 Chambers st., N. Y.	32
Beltting, Makers of.	23
Alexander Bros., 412 N. 3d, Philadelphia.	23
Forepaugh Wm. F., Jr., Bros., Philadelphia.	23
N. Y. Beltting and Packing Co., 37 Park Row, N. Y.	13
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Pope Mfg. Co., 65 Summer, Boston.	38
Bird Cages, Makers of.	3
Jewett John C. & Sons, Buffalo, N. Y.	3
Lindenau John, 247 and 249 Pearl, N. Y.	3
McGraw John, 247 and 249 Pearl, N. Y.	3
Bit Braces, Manufacturers of.	16
Backus Q. S., 102 Chambers st., N. Y.	16
Fray & Pigg, Bridgeport, Ct.	16
Millars' Falls Co., 74 Chambers, N. Y.	21
Blocks, Tackles, Makers of.	28
Burr & Co., 31 Peck St., N. Y.	28
McMillan Wm. H. & Bro., 113 South, N. Y.	28
Penfield Block Works, Lockport, N. Y.	28
Providence Tool Co., Providence, R. I.	28
Blowers and Exhaust Fans.	37
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Boiler Coverings.	27
The Chalmers-Spence Co., foot 9th St., E. R., N. Y.	27
Boil'r Cutters.	20
National Bolt Cutters, 152 Seneca, Cleveland, O.	20
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Bolt Forging Machines.	16
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Coleman Eagle Bolt Works, Philadelphia.	9
Brass, Manufacturers of.	2
Ansonia Brass and Copper Co., 19 Cliff, N. Y.	2
Bridgeport Irons., 19, Bridgeport, Conn.	2
Brass Goods Mfg. Co., 15 Chambers, N. Y.	33
Brown Bros., Chambers, N. Y.	3
Dix of John & Sons, 10 John, N. Y.	3
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Manhattan Brass Co., 1st ave. & 27th st., N. Y.	2
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Rome Iron Works, Rome, N. Y.	3
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New England Butt Co., 30 Platt, N. Y.	38
Sabin Mfg. Co., Montebello, Vt.	27
Stanley Works, New Britain, Conn.	27
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Clemow F. & W., 5 Chambers, N. Y.	10
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Conway T. G., 50 Chambers, N. Y.	25
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Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	25
Frank Rudolph, 220 Fulton, N. Y.	25
Gibson Brothers, Pittsburgh, Pa.	25
Hall & Son, Baltic, N. Y.	25
Justice Philip S., Philadelphia.	24
Kreischer B. & Sons, 50 Goerck, N. Y.	24
Maurer Henry, 148 East 2nd, N. Y.	24
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Ostrander James & Son, Troy, N. Y.	24
Perth Amboy Terra Cotta Co., Perth Amboy, N. J.	24
Valentine M. D. & Bro., Woodbridge, N. J.	24
Watson John R., Perth Amboy, N. J.	24
Woodwell & Co., 100 Franklin, N. Y.	24
Yerkes & Co., 100 Franklin, N. Y.	24
Fire Arms.	25
Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	25
Frank Rudolph, 220 Fulton, N. Y.	25
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Valentine M. D. & Bro., Woodbridge, N. J.	24
Watson John R., Perth Amboy, N. J.	24
Woodwell & Co., 100 Franklin, N. Y.	24
Yerkes & Co., 100 Franklin, N. Y.	24
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Odgen Wallace, 85, 88 and 91 Elm, N. Y.	4
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Pulliman J. Wesley, Philadelphia, Pa.	4
Quincy John W., 98 William, N. Y.	4
Richardson J. O., 22 Dock, Philadelphia.	4
Winter & Co., 147 and 149 Water, N. Y.	4
Kane C., Pittsburgh, Pa.	4
Lundberg Gustaf, 9 Kilby, Boston, Mass.	4
Middleton W. S., 52 John, N. Y.	4
Odgen Wallace, 85, 88 and 91 Elm, N. Y.	4
Pierson & Co., 24 Broadway, N. Y.	4
Pulliman J. Wesley, Philadelphia, Pa.	4
Quincy John W., 98 William, N. Y.	4
Richardson J. O., 22 Dock, Philadelphia.	4
Winter & Co., 147 and 149 Water, N. Y.	4
Plated Ware.	2
Hall, Elton & Co., 75 Chambers, N. Y.	2
The Wm. Rogers Mfg. Co., Hartford, Ct.	2
Plumber's Materials, Manufacturers of.	2
Thompson & Co., 106 Center, N. Y.	2
Silverhardt Jas. M., Scranton, Pa.	2
Pocket Knives.	2
Boker Herman & Co., 104 Duane, N. Y.	2
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Mohawk Hudson Mfg. Co., Waterford, N. Y.	2
Presses, Power, Makers of.	2
Beecher & Peck, New Haven, Conn.	2
Itiss & Williams, 167 Plymouth, Brooklyn.	2
Merriman A. H., West Meriden, Conn.	2
Peerless Punch & Shear Co., 52 Dey, N. Y.	2
The Stiles & Parker Press Co., Middletown, Ct.	2
Pulleys.	2
Penfield Block Works, Lockport, N. Y.	2
Provident Tool Co., Providence, R. I.	2
Plumbers' Makers of.	2
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Gunnison A. B., Eric Penn.	2
Hartford Compressed Air Pump Co., Hartford Conn.	2
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Rumsey L. M. & Co., St. Louis, Mo.	2
Union Mfg. Co., 68 Chambers, N. Y.	2
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Howe Scale Co., Utica, N. Y.	2
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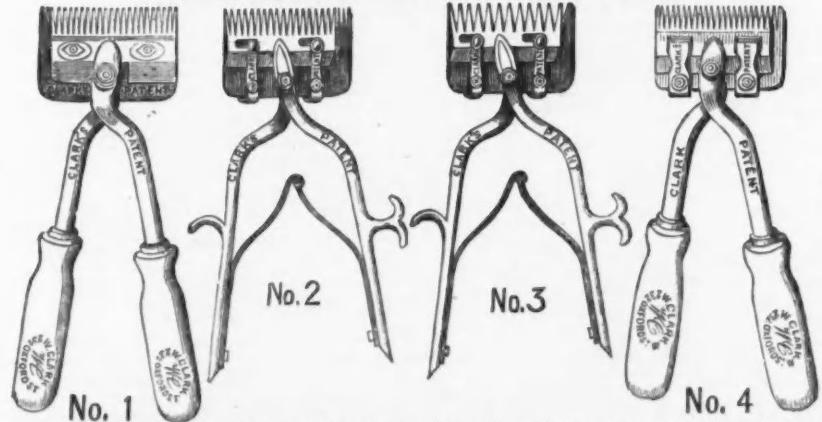
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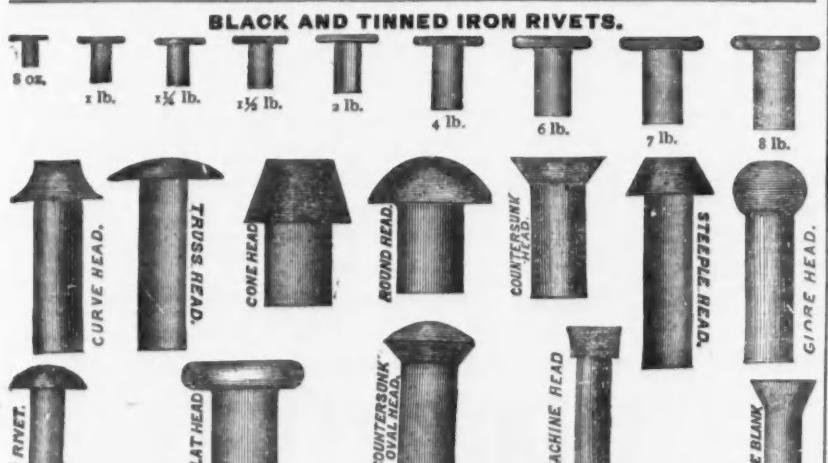
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HOWSON & SON, Philadelphia and Washington, Attorneys for DISSTON & SONS.

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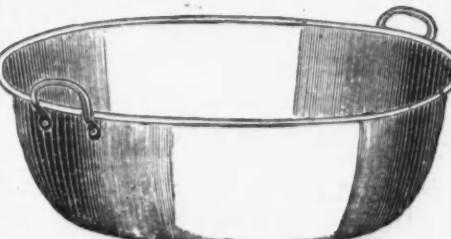
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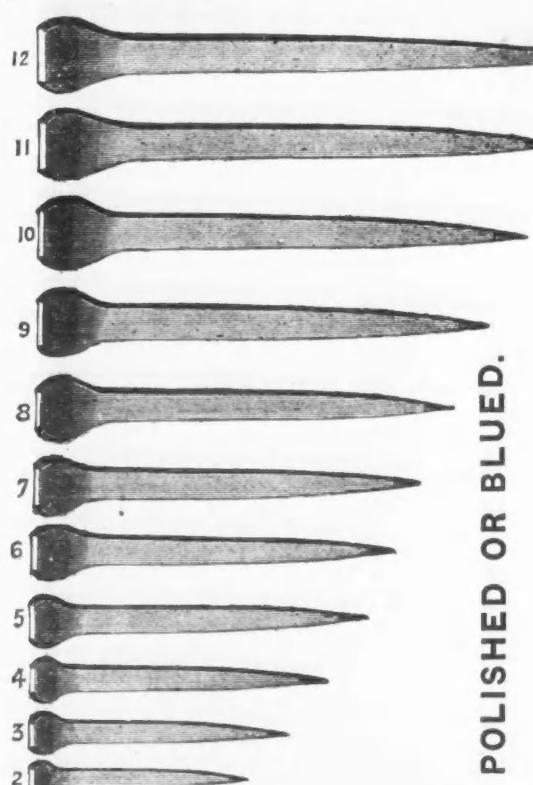
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Twisted, Bent and Drawn
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Hot Forged and Cold Hammered Pointed,

Are the only Nails in market that are made in imitation of the Hand Process. They have the uniformity of Machine Nails and the toughness of those hammered by hand. Our

HOT FORGED AND COLD HAMMERED POINTED NAILS

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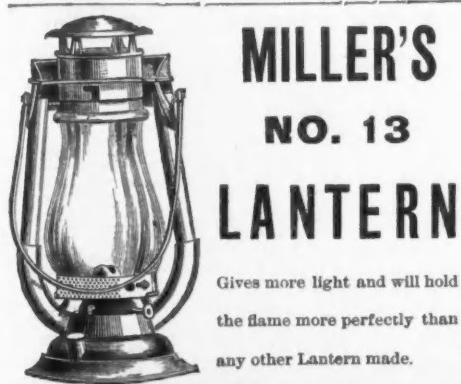
and are acknowledged to be the best in the market. They are used by the best shoers in New York, Brooklyn, Philadelphia, Chicago, Saint Louis, Milwaukee, Baltimore, &c., and

GENERALLY THROUGHOUT THE UNITED STATES.

They also compete successfully in Foreign Countries with machine and hand-made Nails of their own manufacture.

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MILLER'S
NO. 13
LANTERN

Gives more light and will hold the flame more perfectly than any other Lantern made.



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We solicit correspondence from the trade for prices and discounts.

We make Seven Sizes of Roller Mowers and Six Sizes of Side-Wheel Mowers. We claim for our Mowers

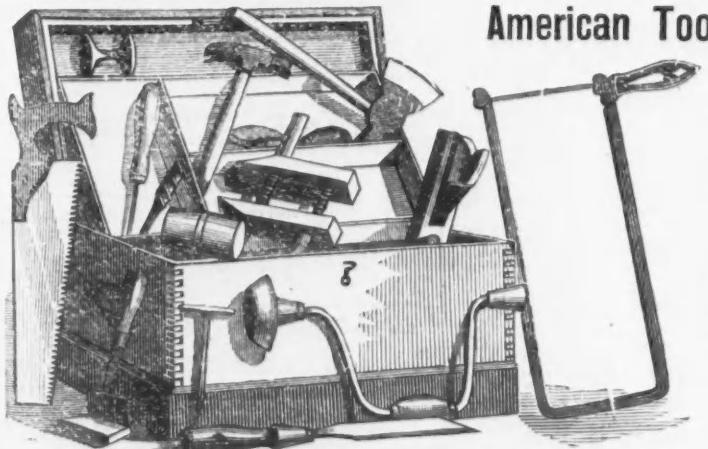
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Fitted up with a superior quality of Tools, and adapted for the home and export trade. Illustrated descriptive catalogue furnished on application. Mechanics' Tools and Hardware specialties.

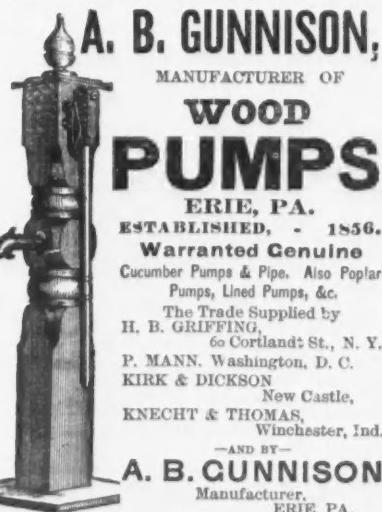
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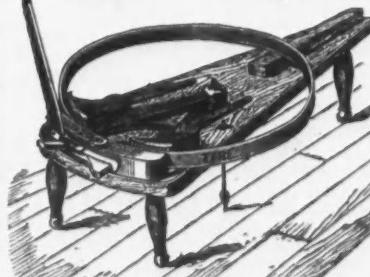
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For Scythes, Axes, Knives and Turpentine Hacks.
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SEND
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A Day's Wash can be done in two hours. It will fit all kinds and sizes of Tubs.

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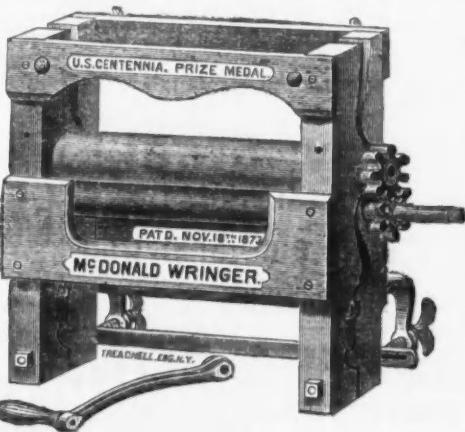
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It is very strong. Holds very strong. Will not detach finished work. Holds round square or irregular work. Always stands up square with the work and will not "skew." Is more evenly balanced than the common dog. Send for circular.

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SPRING HINGES WITH Patent Anti-Friction Springs, FOR SCREEN DOORS.

PRICE LIST.—Per Dozen Pairs.

SINGLE JOINT HINGES. (To Swing one Way.)

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	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2½ inch.....	\$ 3 00	\$ 4 50	\$ 5 00	\$ 6 50
3 ".....	4 50	6 50	6 75	8 75
5 ".....	7 50	10 00	10 00	12 50

DOUBLE JOINT HINGES.

(To Swing both Ways.)

To be used on Door 1 inch thick, or less.

SIZE.	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2½ inch.....	\$ 6 60	\$ 9 00	\$11 50	\$14 25
3 ".....	8 30	11 50	13 50	17 00
5 ".....	16 50	21 00	21 50	26 00
6 "Double for Office Doors.....			54 00	

The large cut represents full size of our 5-inch Double Joint Acorn Tip Hinge for mortising. The small cut represents the plain Single Joint Hinges, but not full size. Sample pair will be sent by mail on receipt of price.

Liberal Discount to the Trade.

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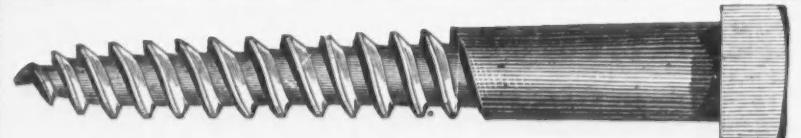
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ALL KINDS OF

Machine and Plow Bolts,
FORGED SET SCREWS,
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TAP BOLTS.

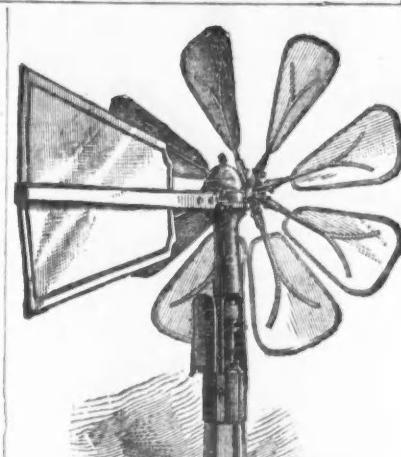


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NEW YORK AGENT
NATIONAL BOLT CUTTERS
GUARANTEED AHEAD OF ALL
OTHERS FOR MANUFACTURERS &
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SEND FOR CATALOGUE
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Water Driven to any Height and Distance
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Faucets, &c. The best Pump for Irrigating, supplying
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Air Pump Co., Hartford, Conn., U. S. A.

PAT. "SCREW WINDOW BALANCES."

Retail Price, \$ per window (four balances).

Liberal Discount to the Trade.

Retain Medium and Light Window Sash at
any point of opening, with large surplus hold-
ing power in any direction, if required
by drawing the adjusting screws. An ac-
quaintance with the genuine
merits of these goods, and their
uses in the various parts in use will
ensure to them the favor of the
user and applicator.

A Mechanism always wanted,
as far as possible, to do away
with the common sash
pulley, rendering the use of
boxed frames, cord pulleys,
etc., the simple task of
hanging sash unnecessary.

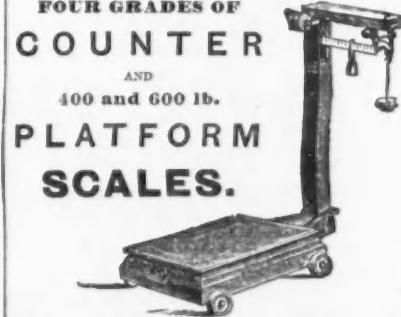
Sashes are locked with a meet-
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Send for circular and
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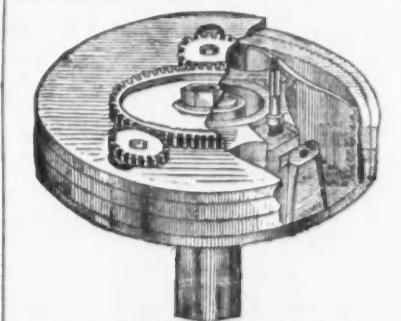
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Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.
DEOXIDIZED BRONZE,
Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.**PHILADELPHIA, October 4, 1880.
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Very truly,
HENRY DISSTON & SONS.**WIRE NAILS**French Points,
Window Shade Nails,
Upholstering, WAGON NAILS, Molding Nails

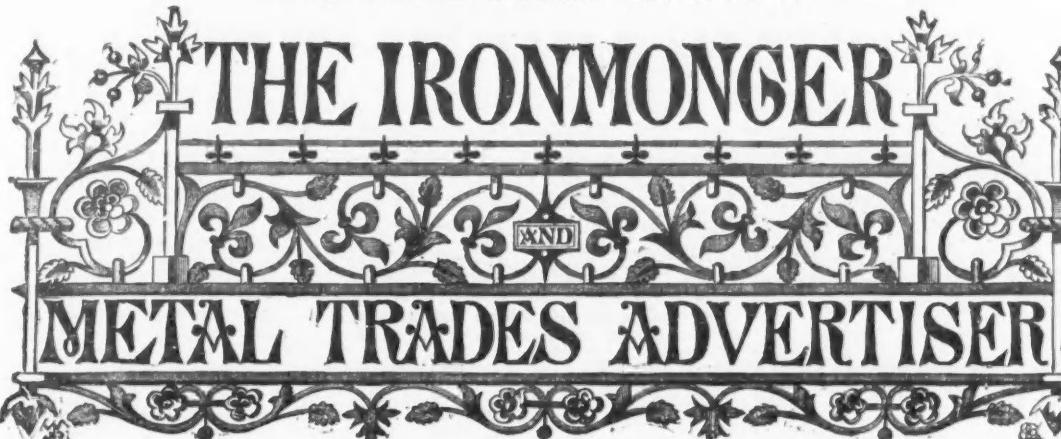
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THE WHOLE FOREIGN HARDWARE TRADE,

so far as experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and *FOREIGN SUPPLEMENT* is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

**B. KREISCHER & SONS,
FIRE BRICK.**

BEST AND CHEAPEST.

Established 1845.
Office, foot of Houston Street, East River,
NEW YORK.

NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

**FIRE BRICK
Stove Linings,**

Range and Heater Linings

Cylinder Brick, &c., &c.

M. D. Valentine & Bro

Manufacturers of

**FIRE BRICK
And Furnace Blocks**

DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

BORGNER & O'BRIEN,

Manufacturers

FIRE BRICK

AND

Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,
Twenty-third Street,
Above Race,
PHILADELPHIA.

Twenty years' practical Experience.

PERTH AMBOY TERRA COTTA CO.,

Successors to

**A. HALL & SONS, Perth Amboy, N. J.,
ARCHITECTURAL TERRA COTTA**

AND

FIRE BRICK.

170 Broadway. NEW YORK.

Brooklyn Clay Retort

AND

FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Brick, Gas Houses and other Tile, Cupola Brick, &c. Dealers in and Miners of Fire Clay and Fire Sand. Clay beds at Ebury's Creek, New Jersey. Manufactory: Van Dyke, Elizabeth, Richards and Partition Sts., Brooklyn, N.Y. Office: No. 88 Van Dyke St.

Watson Fire Brick Manufactory,

ESTABLISHED 1855.

JOHN R. WATSON, Perth Amboy, New Jersey.

Manufacturer of

FIRE BRICK,

For Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Tanneries, Boiler and Grate Setting, Glass Works, &c. Fire Clays, Fire Sand, and Kaolin for Sale.

HENRY MAURER,

Proprietor of the

**Excelsior Fire Brick & Clay
Retort Works,**

Manufacturer of FIRE BRICK, HOLLOW
BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY.

Offices & Depot, 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS,

Troy, N. Y.

JAMES OSTRANDER & SON,

ESTABLISHED 1848.

Manufacturers of

FIRE BRICK,

Tuyeres, Tiles, Blast Furnace Blocks, &c. Miners and Dealers in Woodbridge Fire Clay and Sand, and Stoneware stand Kaolin.

Established 1864.

GARDNER BROTHERS,

Manufacturers of

**STANDARD SAVAGE FIRE BRICK,
TILE & FURNACE BLOCKS,**

OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and
Miners and Shippers of Fire Clay.

OFFICE: 116 Smithfield St., Pittsburgh, Pa.

WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

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FIRE BRICK,

Buffalo, N. Y.

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(Established 1844).

FIRE and RED BRICK,

And Brickmakers' Tools in General.

SAM'L. P. MILLER & SON,

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RUDOLPH FRANK,

Office, 229 FULTON STREET.

NEW YORK.

ALUMINA and
SILICA

FIRE BRICKS

Works,

BROOKLYN, on

the East River.

Through Cars, Canal Boats

and Vessels loaded direct from the

Works to all points.

**PURE SILICA FIRE BRICK,
MADE BY THE**

Landore Siemens Company,

Specially for OPEN-HEARTH FURNACES.

More "heats" obtained from them than from any other Bricks known.

Imported, to order only, by

PHILIP S. JUSTICE, Sole Agent in United States,
14 NORTH FIFTH STREET, PHILADELPHIA.

E. PASSE, Proprietor

CHAS. PASSE, Superintendent.

**Universal Machine Works,
CINCINNATI, OHIO.**

Established 1876.



GRINDSTONE FRAME. New Improved for Foot Power.

Diameter of stone 20 in., \$5.00; 30 in., \$6.00. Price without stone.

Foot-Power Wood-Working Machines, for Manufacturers' Purposes, Iron Frames; Rip and Cross-Cut Saws, Scroll Saws, Boring Machines, Turning Lathes, Drill Presses, &c.

Ans for Factory Purposes, Free-Hanging Drill Presses for Heavy Work, Upright and Bench Drills, Single and Double-Headed Frizzers, Tools for Machines of every description.

The excellence of this superior stone cannot be too highly appreciated by Manufacturers. The builders of Rolling and Drawing Machines readily admit and recommend that my Grindstone is best suited for sharpening the knives of such machines. It is portable, light, durable and fast cutting. The frame is made exclusively from hard wood, and every joint is glued.

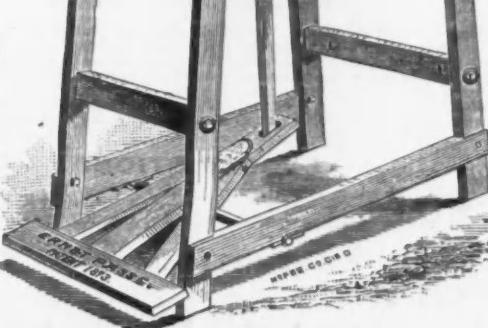
Carpenters, Star Builders, Furniture Manufacturers and Butchers will do well to pay special attention to this tool. It is made for two stones; one for light work, the other for the heaviest grinding.

Parties having Frames and wanting Fixtures can get them on short notice.

TESTIMONIAL.

CINCINNATI, December 17, 1876.
We are using Ernst Passee's Patent Grindstone, and find it to be the most complete and conveniently arranged Grindstone we have seen.

MORRIS SASH LOCK MFG. CO.,
George McGregor, Sup't.



Improved Bench Stop for
Carpenters.

All Malleable Iron.

This tool is improved in every particular. It works by a double-headed screw.

"BLAKE'S CHALLENGE" ROCK BREAKER.

Patented November 18, 1879.

BLAKE CRUSHER CO., new Haven, Conn., Sole Makers.

Awarded First-Class Medal of Superiority by the American Institute, 1879.

Rapidly superseding all old styles of Blake Crushers, on account of its superior strength, efficiency and economy. Adopted by leading Mining and Railway companies, and many important cities and towns. Blake Crushers of all old style, containing patented improvements exclusively our own, for sale at low figures. The public is cautioned to beware of the representations of certain parties who have imitated our patterns of these, copied our old cuts, and are advertising "Blake Crushers" weighing 1300 pounds less than ours, at same price. For circulars relating to the new "Blake's Challenge," and all older styles of Blake Crushers, address

BLAKE CRUSHER CO., New Haven, Ct.

Patentees and Original Manufacturers under patents of Eli W. Blake and Theo. A. Blake.

**"PINNACLE"
SASH LOCK.**

BURGLAR PROOF.

In locking, the arm is brought forward, and the spring bolt engages with the post in the back plate. In unlocking, the knob is pulled out, and the arm throws back, where it is held. Only one spring is used in the lock.

Send for Illustrated Catalogue.

The Leading Wrenger of
America.

SIMPSON & GAULT,

(Peerless Wrenger Co.)

European Offices,
Place Vendome, Paris.
79 Chambers St.,
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Office and Factory,
CINCINNATI, OHIO.

PEERLESS

Clothes Wringers,

Sold by the Jobbing Trade everywhere.

No Better in the World.

strongest and most compact.

Most Saleable Wrenger in the Market.

TRY A SAMPLE ORDER.

Send for Illustrated Catalogue.

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PHILLIPS, BENTON & CO., Agts. at Nashville, Tenn.

J. MACLAY & CO., Agts. at Atlanta, Ga.

BUTLER & DIEL, Agts. at Syracuse, N. Y.

10,000 Sold the First Year.

THE BEST ADJUSTABLE BAG HOLDER

In the World.

PRICE ONLY \$1.50.

Sent free, on receipt of the price, anywhere in the United States.

It is made of iron, will fit any sack, wide or narrow, and will last a lifetime. Just the thing for the Hardware trade and Manufacturing, and all Department dealers. A large discount to the trade and agents. Your orders respectfully solicited, and agents wanted for this best selling article in the market.

Address,

L. JEFF. SPRENGLE,

Sole Manufacturer,

Ashland, Ohio.

Who would do with it for \$1.50?

The platform does not go with the holder; it is extra if wanted.

TRADE MARK.

ALSO MANUFACTURERS OF

LINSEED OIL.

182 Front Street, NEW YORK.

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WHITE LEAD.

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LIQUID LITHARGE.

TRADE MARK.

PHILADELPHIA.

(Corrected Weekly by Lloyd, Supplee & Walton.)
Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Axles.	
Peter Wright's, 10 ft.	per doz \$11.00
Over 250 lbs.	11.00 net
Each additional 100 lbs.	.10c per lb. less 20% net
Apple Payers.	per doz \$4.00 net
Reading No. 72.	" 5.00 net
" No. 74.	" 6.00 net
" No. 76.	" 7.00 net
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Peach Payers.	" 15.00 net
Little Favorites, corer and slicer.	" 7.50 net
Lots of 10 to 24 dozen special price.	
Axes.	
Hunt's Kentucky and Yankee.	per doz \$11.00
Mann's Red Warrior.	11.00 net
High Grade.	12.00 net
Bevelled Axes.	add 50c net
Double Bit Axes.	.net " 22.00
Augers and Auger Bits.	New List January 1.
Baldwin Augers.	list \$1.40
Cook's Augers.	list \$1.40
Watrous' Ship Augers.	list 15¢
Benjamin Pierce Auger Bits.	list 35¢
Grooved Auger Bits.	list 20¢
Cook's.	list 20¢
Jennings'.	list 10, 10¢
Bonney's Pat. Hol. Augers, list \$3.00	list 20¢
Stevens' Pat. Hol. Augers, list \$3.00	list 20¢
Guaranteed.	list 20¢
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Bells.	
Bevin Bros. Mfg. Co. Light Hand Bells.	list 5¢
Silver Hand Bells.	list 10¢
Connell's Door Bells.	list 30¢
Gr. Western & Kentucky Cow, new list.	list 40¢
Bolt and Rivet Clippers.	
Chambers' for 3¢ bolt.	each, 7¢ 50¢
No. 2, " 3¢ " 12.00	list 15¢
Bowing Machines.	
Upright with Camera.	List 5¢
Angular, without Augers.	list 33¢ 5¢
Bolts—Eastern Carriage Bolts.	list 6¢ cash
Philadelphia.	new list 10¢
Stanley's, bought Shutter.	list 10¢
Brace-Barber's.	list 10¢
Backus.	list 10¢
Spoofford.	list 10¢
American Bars.	list 10¢
Batts.—Cast Fast Joint, New York.	list 10¢
Cast Loose Joint, Narrow.	list 10¢
" Acorn, Loose Pin.	list 20¢
" Mayer's Loose Joint.	list 20¢
Wrought Iron.	list 20¢
" Table Hinged and Back Flaps.	list 20¢
" Narrow, Fast.	list 20¢
" Loose Joint.	list 20¢
Blind Buttons.	
Parker.	list 10¢
Clark.	list 10¢
Shepard.	list 10¢
Lod. Porter.	list 10¢
Huffer's.	list 10¢
Chains—German Haister and Coil, new list Oct. 22, 1870.	list 10¢
Gated and Fitted.	list 10¢ net
Boat Proof Coil Chain, list 10¢	list 10¢
For D. 13 1/2 14 1/2 15 1/2 16 1/2 17 1/2 18 1/2 19 1/2 20 1/2 21 1/2 22 1/2 23 1/2 24 1/2 25 1/2 26 1/2 27 1/2 28 1/2 29 1/2 30 1/2 31 1/2 32 1/2 33 1/2 34 1/2 35 1/2 36 1/2 37 1/2 38 1/2 39 1/2 40 1/2 41 1/2 42 1/2 43 1/2 44 1/2 45 1/2 46 1/2 47 1/2 48 1/2 49 1/2 50 1/2 51 1/2 52 1/2 53 1/2 54 1/2 55 1/2 56 1/2 57 1/2 58 1/2 59 1/2 60 1/2 61 1/2 62 1/2 63 1/2 64 1/2 65 1/2 66 1/2 67 1/2 68 1/2 69 1/2 70 1/2 71 1/2 72 1/2 73 1/2 74 1/2 75 1/2 76 1/2 77 1/2 78 1/2 79 1/2 80 1/2 81 1/2 82 1/2 83 1/2 84 1/2 85 1/2 86 1/2 87 1/2 88 1/2 89 1/2 90 1/2 91 1/2 92 1/2 93 1/2 94 1/2 95 1/2 96 1/2 97 1/2 98 1/2 99 1/2 100 1/2 101 1/2 102 1/2 103 1/2 104 1/2 105 1/2 106 1/2 107 1/2 108 1/2 109 1/2 110 1/2 111 1/2 112 1/2 113 1/2 114 1/2 115 1/2 116 1/2 117 1/2 118 1/2 119 1/2 120 1/2 121 1/2 122 1/2 123 1/2 124 1/2 125 1/2 126 1/2 127 1/2 128 1/2 129 1/2 130 1/2 131 1/2 132 1/2 133 1/2 134 1/2 135 1/2 136 1/2 137 1/2 138 1/2 139 1/2 140 1/2 141 1/2 142 1/2 143 1/2 144 1/2 145 1/2 146 1/2 147 1/2 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1/2 5044 1/2 5045 1/2 5046 1/2 5047 1/2 5048 1/2 5049 1/2 5050 1/2 5051 1/2 5052 1/2 5053 1/2 5054 1/2 5055 1/2 5056 1/2 5057 1/2 5058 1/2 5059 1/2 5060 1/2 5061 1/2 5062 1/2 5063 1/2 5064 1/2 5065 1/2 5066 1/2 5067 1/2 5068 1/2 5069 1/2 5070 1/2 5071 1/2 5072 1/2 5073 1/2 5074 1/2 5075 1/2 5076 1/2 5077 1/2 5078 1/2 5079 1/2 5080 1/2 5081 1/2 5082 1/2 5083 1/2 5084 1/2 5085 1/2 5086 1/2 5087 1/2 5088 1/2 5089 1/2 5090 1/2 5091 1/2 5092 1/2 5093 1/2 5094 1/2 5095 1/2 5096 1/2 5097 1/2 5098 1/2 5099 1/2 50100 1/2 50101 1/2 50102 1/2 50103 1/2 50104 1/2 50105 1/2 50106 1/2 50107 1/2 50108 1/2 50109 1/2 50110 1/2 50111 1/2 50112 1/2 50113 1/2 50114 1/2 50115 1/2 50116 1/2 50117 1/2 50118 1/2 50119 1/2 50120 1/2 50121 1/2 50122 1/2 50123 1/2 50124 1/2 50125 1/2 50126 1/2 501	

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Successors to Milo Peck, Manufacturers of



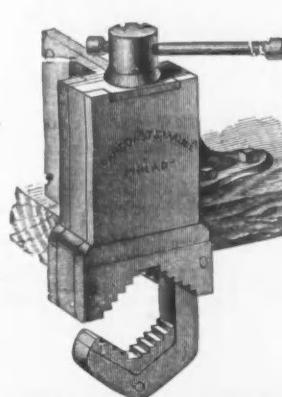
11 Regular Sizes. Hammers from 50 lbs. to 2500 lbs.
WE HAVE A LARGE STOCK OF SPECIAL DROP PATTERNS.

Special attention given to the making of all Drop Dies.
Special Machinery fitted up to order.

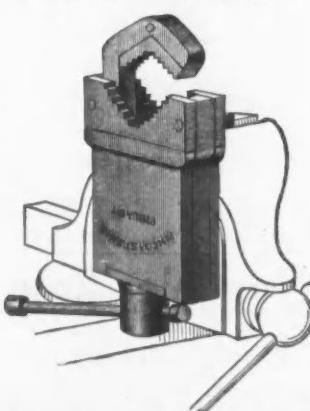
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New Haven, Conn.

IMPROVED PIPE-FITTERS' VISE.



STRONG,
LIGHT,
EFFICIENT,
CHEAP.



To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe-Fitter's Vise, which can be used either as a permanent fixture to work-bench, or attached to angle plate, or can (unless otherwise held) be held between the jaws of any Miller's or Blacksmith's Vise. The movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it in front, and allows of FITTINGS BEING HELD securely; the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is strong, light, efficient and cheap, which can be readily carried about with kit of tools.

MANUFACTURED BY
PANCOAST & MAULE,
243 and 245 South Third Street, Philadelphia.

THE BUCKEYE LAWN MOWERS.



SENIOR BUCKEYE.

10 inch.....	\$14.00	15 inch.....	\$22.00	10 inch.....	\$13.00
12 inch.....	18.00	18 inch.....	24.00	12 inch.....	14.00
14 inch.....	25.00	14 inch.....	16.00		

The lightest and easiest running Mower in the market. It is unequalled for simplicity, strength and durability. It is compact, thoroughly made and beautifully finished. Every Mower warranted as represented.

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SPRINGFIELD, OHIO.

Wheeler, Madden & Clemson

MFG. CO.,

MIDDLETOWN, NEW YORK.

Manufacturers of

WARRANTED CAST STEEL

SAWS

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand,
WOOD SAWS, Etc., Etc.

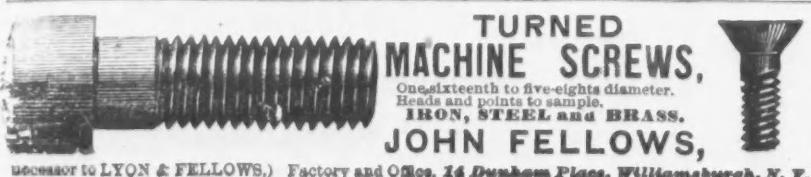
AMERICAN SAW CO.,

Manufacturers of

Movable Toothed Circular Saws,
PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds.

Trenton, N. J.



TURNED
MACHINE SCREWS,
One sixteenth to five-eights diameter.
Heads pointed to sample.
IRON, STEEL and BRASS.

JOHN FELLOWS,

Incorporated to LYON & FELLOWS, Factory and Office, 1st Dunham Place, Williamsburg, N. Y.

L. M. RUMSEY & CO.

MANUFACTURERS & JOBBERS OF

PUMPS & FIRE ENGINES,

LEADPIPE & SHEET LEAD,

PLUMBERS & STEAM FITTERS,

RAILWAY SUPPLIES, & FITTINGS,

NO. 810, N. SECOND STREET, ST. LOUIS, MO.

BELTING, HOSE, & PACKING CO.

Manufacturers of GALVANIZED PUMP CHAIN FOR CHAIN PUMPS.

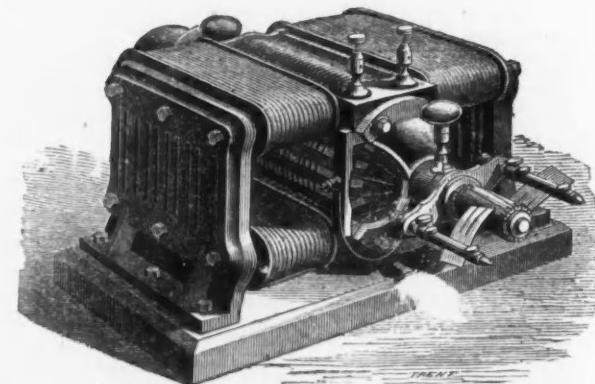
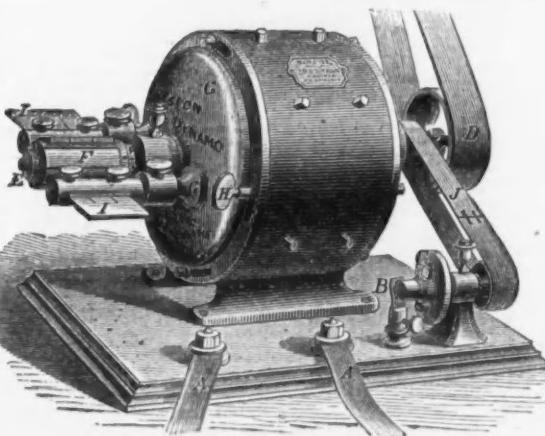
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286 Washington Street, Newark, N. J., U. S. A.,

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MANUFACTURERS OF

Machines for Electric Light, Electrotyping and Electro-Plating.



ARE MAKING

THE MOST POWERFUL, SIMPLE AND COMPACT ELECTRIC LIGHT MACHINE IN THE WORLD.

By actual test, this machine has been found to yield more than double the amount of light per horse-power obtained from the best machines built in this country.

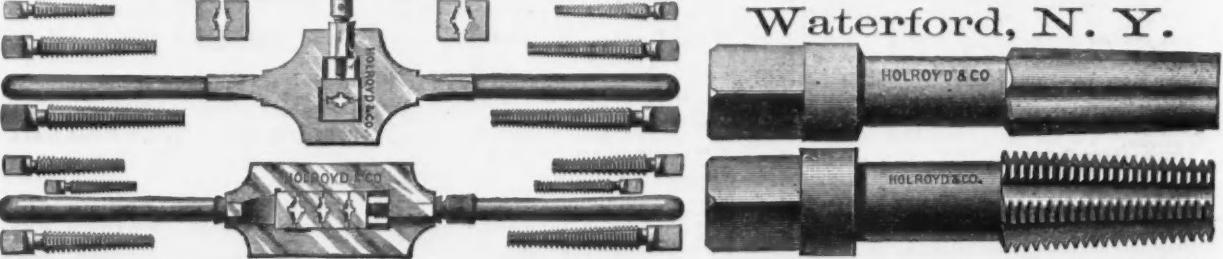
Please send full particulars regarding buildings or localities to be lighted, available power, &c.

Centennial Gold Medal American Institute, 1876. Medal of Superiority, American Institute, 1877.

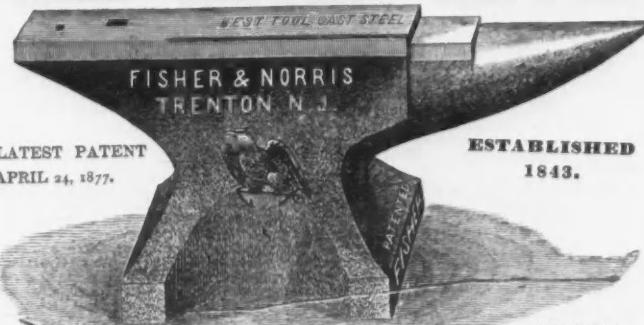
Centennial Medal, Philadelphia, 1876. Paris Medal, 1878.

HOLROYD & CO.,

Waterford, N. Y.



THE "EAGLE" ANVIL.



WARRANTED!!

Better than the Best English Anvil.
Each anvil piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

PRICE LIST, APRIL 1, 1880.

ANVILS weighing 10 lbs. to 200 lbs. \$10 cents per lb.

SMALLER ANVILS ("MINIMS.")

No. 000	00	0	1	2	3
1/2	4	10	15	20	30 lbs.
1 1/2	2.00	2.75	3.25	4.00	
2	5	7	9	12	

Weighing about

40 lbs. 60 lbs. 80 lbs. 100 lbs.

60 lbs. 80 lbs. 100 lbs. 120 lbs.

80 lbs. 100 lbs. 120 lbs. 140 lbs.

100 lbs. 120 lbs. 140 lbs. 160 lbs.

120 lbs. 140 lbs. 160 lbs. 180 lbs.

140 lbs. 160 lbs. 180 lbs. 200 lbs.

160 lbs. 180 lbs. 200 lbs. 220 lbs.

180 lbs. 200 lbs. 220 lbs. 240 lbs.

200 lbs. 220 lbs. 240 lbs. 260 lbs.

220 lbs. 240 lbs. 260 lbs. 280 lbs.

240 lbs. 260 lbs. 280 lbs. 300 lbs.

260 lbs. 280 lbs. 300 lbs. 320 lbs.

280 lbs. 300 lbs. 320 lbs. 340 lbs.

300 lbs. 320 lbs. 340 lbs. 360 lbs.

320 lbs. 340 lbs. 360 lbs. 380 lbs.

340 lbs. 360 lbs. 380 lbs. 400 lbs.

360 lbs. 380 lbs. 400 lbs. 420 lbs.

380 lbs. 400 lbs. 420 lbs. 440 lbs.

400 lbs. 420 lbs. 440 lbs. 460 lbs.

420 lbs. 440 lbs. 460 lbs. 480 lbs.

440 lbs. 460 lbs. 480 lbs. 500 lbs.

460 lbs. 480 lbs. 500 lbs. 520 lbs.

480 lbs. 500 lbs. 520 lbs. 540 lbs.

500 lbs. 520 lbs. 540 lbs. 560 lbs.

520 lbs. 540 lbs. 560 lbs. 580 lbs.

540 lbs. 560 lbs. 580 lbs. 600 lbs.

560 lbs. 580 lbs. 600 lbs. 620 lbs.

580 lbs. 600 lbs. 620 lbs. 640 lbs.

600 lbs. 620 lbs. 640 lbs. 660 lbs.

620 lbs. 640 lbs. 660 lbs. 680 lbs.

640 lbs. 660 lbs. 680 lbs. 700 lbs.

660 lbs. 680 lbs. 700 lbs. 720 lbs.

680 lbs. 700 lbs. 720 lbs. 740 lbs.

700 lbs. 720 lbs. 740 lbs. 760 lbs.

720 lbs. 740 lbs. 760 lbs. 780 lbs.

740 lbs. 760 lbs. 780 lbs. 800 lbs.

760 lbs. 780 lbs. 800 lbs. 820 lbs.

780 lbs. 800 lbs. 820 lbs. 840 lbs.

800 lbs. 820 lbs. 840 lbs. 860 lbs.

820 lbs. 840 lbs. 860 lbs. 880 lbs.

840 lbs. 860 lbs. 880 lbs. 900 lbs.

860 lbs. 880 lbs. 900 lbs. 920 lbs.

880 lbs. 900 lbs. 920 lbs. 940 lbs.

900 lbs. 920 lbs. 940 lbs. 960 lbs.

920 lbs. 940 lbs. 960 lbs. 980 lbs.

940 lbs. 960 lbs. 980 lbs. 1000 lbs.

960 lbs. 980 lbs. 1000 lbs. 1020 lbs.

980 lbs. 1000 lbs. 1020 lbs. 1040 lbs.

1000 lbs. 1020 lbs. 1040 lbs. 1060 lbs.

1020 lbs. 1040 lbs. 1060 lbs. 1080 lbs.

1040 lbs. 1060 lbs. 1080 lbs. 1100 lbs.

1060 lbs. 1080 lbs. 1100 lbs. 1120 lbs.

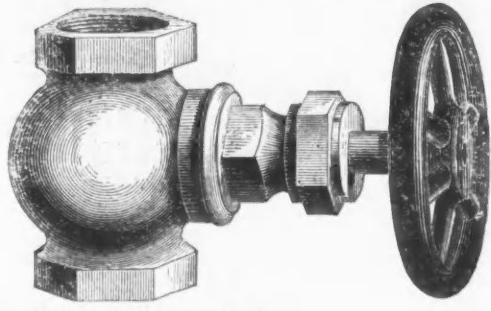
1080 lbs. 1100 lbs. 1120 lbs. 1140 lbs.

1100 lbs. 1120 lbs. 1140 lbs. 1160 lbs.

1120 lbs. 1140 lbs. 1160 lbs. 1180 lbs.

1140 lbs. 11

McNab & Harlin Mfg. Co.,
MANUFACTURERS OF
BRASS COCKS AND VALVES,
For STEAM,
WATER
and GAS.
WROUGHT IRON
PIPE AND FITTINGS,
PLUMBERS' MATERIALS

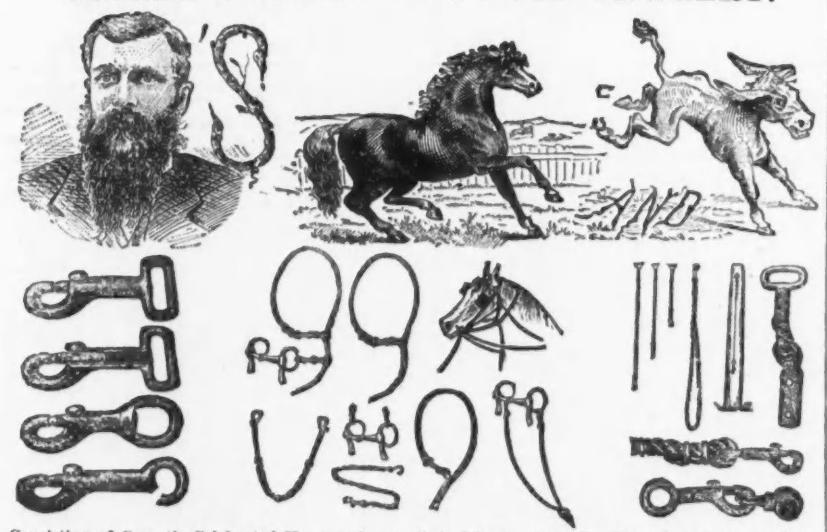


Factory, Paterson, N. J.
56 John Street, N. Y.

COVERT'S
Patent Improvement in
ROPE GOODS.
No more Splicing or Winding
Ends with Cord.



No. 1.
Rope Halters, Horse Ties, Cattle Ties, Halter Leads, &c., made by clamping the lap with steel rings, as shown in cut. Also, clamping the end with a ring to prevent unbraiding.
This is all accomplished by machinery, and a superior article can be made at so much less cost, it will not pay any one to make up goods the old way. We are now prepared to furnish the trade the cheapest and best Rope Halters ever made. No. 1 illustrates the twisted and irregular form of the spliced Halter; also the insecure method of whipping the end with cord, which invariably comes off, and allows the rope to untwist. No. 2 illustrates the New Halter. It is made by clamping the laps with steel rings. The end is also secured with a steel ring, which will remain as long as the rope lasts. We have also a full line of

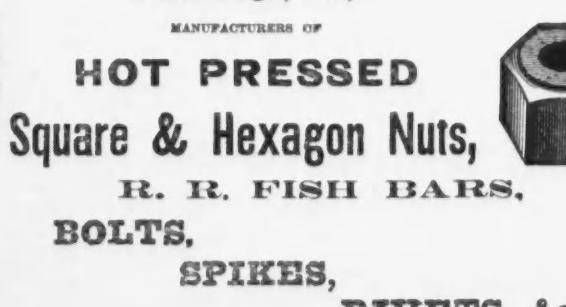
COVERT'S HORSE AND MULE JEWELRY.

Consisting of Covert's Celebrated Harness Snaps, Swivel Snaps, Open Eye Bit and Chain Snaps, Snap and Thimble for Horse and Cattle Ties, Rope Goods, consisting of Horse Ties, Cattle Ties and Halter Leads, Leather Horse Ties, Breast Chains, Halter Chains, Martingale Chains, Rein Chains, Post Chains, Post Rods, &c. These goods are far superior to anything on the market. They are sold by all leading jobbers in general and saddlery hardware at manufacturers' prices. Send for illustrated catalogue and price list. Address **COVERT MFG. CO.** Sole Manufacturers, West Troy, N. Y.

STANDARD NUT CO.,
Pittsburgh, Pa.

MANUFACTURERS OF

HOT PRESSED
Square & Hexagon Nuts,
R. R. FISH BARS,
BOLTS,
SPIKES,
RIVETS, &c.

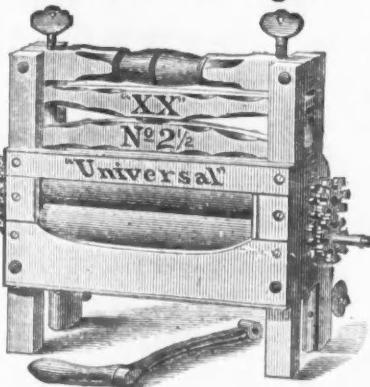



THE MAGEE
Patent Sink.
MAGEE FURNACE CO.,
Boston, Mass.



Universally acknowledged to be without an equal as a Kitchen Sink. Send for Descriptive Circular and Prices.

PRENTISS PATENT VISES
ADJUSTABLE JAWS,
Stationary & Patent Swivel Bottoms
ADAPTED TO ALL KINDS OF VISE WORK.
HALL MFG. CO., 23 DEY ST., NEW YORK.
Send for Circular.


THE "OLD RELIABLE"
UNIVERSAL
Clothes Wringer.

Improved with Rowell's Double Cog-Wheels on both ends of each roll.

Over 500,000 sold!

And now in use, giving "Universal" satisfaction

EVERY WRINGER WARRANTED.

Be sure and inquire for the "Universal."

Sold by the **Principal Jobbers in Hardware and House-Furnishing Goods** everywhere.

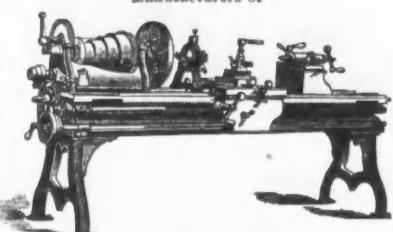
Special rates given for export.

Metropolitan Washing Machine Co.
32 Cortlandt St., New York.**STEAM PUMPS,****STEAM ENGINES,****Air Compressors,****HOISTING ENGINES.****The Norwalk Iron Works Co.,**
SOUTH NORWALK, CONN.**Castle Hose Reel and Carriage.**
Patented 1878.

The most perfect device yet invented for handling small hose. The only adjustable Reel in the market. Write for discounts.

R. D. WOOD & CO.
Philadelphia,
Manufacturers of**Cast Iron Pipe**
FOR WATER AND GAS.
Lamp Posts, Valves, &c.,
Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

WM. S. CARR & CO.Sole Manufacturers of
CARR'S
PATENT
Water
Closets,
PUMPS, CABINET WOOD WORK, &c.
100, 108 & 110 Centre Street,
Factory, New Haven, NEW YORK.**P. BLAISDELL & CO.,**
Manufacturers of**MACHINISTS' TOOLS,**Blaisdell's Patent Upright Drills,
With Quick Return Motion.**Engine Lathes, Planers, Boring Mills,**
Gear Cutters and Hand Lathes.

WORCESTER, MASS., U. S. A.

Holt Portable Forge.

All Styles and Sizes.



Furnaces for Jewelers and Assayers

MANUFACTURED BY
HOLT'S CLEVELAND GAUGE CO.,
Chapman St., Cleveland, O.New York Office, 79 and 81 Beale St.,
F. PORTER THAYER, Manager.**BOSTON.**

Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.

Avuls.—"Eagle American," 10 ft. 6 in. dia. 20% per ft. \$2.00

Apple Paper.—Reading Turn Table, 10 ft. 6 in. dia. 20% per ft. \$2.00

" Improved Turn Table & Push-off" 7.50

" Lightning" 6.00

Hudson's Turn Table and Push-off" 6.00

Aiken's Tools... 40 & 50

Avil & Vice... 10 ft. 6 in. dia. 20% each

Augurs & Bits—Shell's Auger, U'Hommeau's Ship Augers... 10 ft. 6 in. dia. 20% each

Jennings's Bits... 10 ft. 6 in. dia. 20% each

Cook's Bits... 10 ft. 6 in. dia. 20% each

" Sharpened" 10 ft. 6 in. dia. 20% each

Shepardson's Double-Cut Bits... Gimlets... 10 ft. 6 in. dia. 20% each

Stearns's Extension Hollow Augers... per doz. \$2.00

per doz. \$2.00

Pierce's Bits... 10 ft. 6 in. dia. 20% each

Griswold... 10 ft. 6 in. dia. 20% each

Axes.—Blad JACKets... per doz. 11.00

Red Cross... per doz. 10.00

Dowse... per doz. 11.00

Ax Handles... Boys... 10 ft. 6 in. dia. 20% each

Ax Handles... Oak Extra, 31 in. No. A... 10 ft. 6 in. dia. 20% each

" 34 in. No. A... 10 ft. 6 in. dia. 20% each

" 31 in. No. B... 10 ft. 6 in. dia. 20% each

" 31 or 34 in. No. C... 10 ft. 6 in. dia. 20% each

Axe Clamps... 10 ft. 6 in. dia. 20% each

Dowse... 10 ft. 6 in. dia. 20% each

Ax Handle... Bed Rail... 10 ft. 6 in. dia. 20% each

Ax Handle... Half Round... per ft. 5% 65¢ 75¢ 85¢

" Wrought Iron... per ft. 5% 65¢ 75¢ 85¢

Bed Rail Connect's Crank Gong... 10 ft. 6 in. dia. 20% each

Bird Cages... Japanned M. B. & D., reduced list, 18 in. dia. 20% each

Brass... 10 ft. 6 in. dia. 20% each

Bull Fists... Lock Fists... 10 ft. 6 in. dia. 20% each

C. C. Sets... 10 ft. 6 in. dia. 20% each

Veazie Fists... 10 ft. 6 in. dia. 20% each

Shedd's... 10 ft. 6 in. dia. 20% each

" 10 ft. 6 in. dia. 20% each

Bull Fists... 10 ft. 6 in. dia. 20% each

Bull Fists... 10 ft. 6 in. dia. 20% each

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Bull Fists... 10 ft. 6 in. dia. 20% each

Bull Fists... 10 ft.

Machinery, &c.

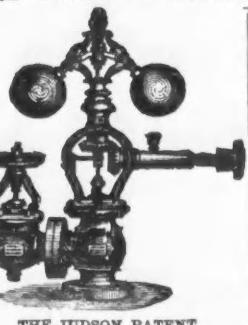
THE JUDSON GOVERNOR.

It is a common method to advertise Goods *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to become useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying a Governor should stipulate that its durability be guaranteed, and should also take care that they do not, for much inferior governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in accuracy and durability—the main essentials—we guarantee it shall do more.

Reduced Price List.

OCTOBER 15, 1878.

For dimensions of Governor, see Illustrated Price List.



THE JUDSON PATENT

Improved Steam Governor.

No Charge for Boxing or Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

THE SHIVE STEAM ENGINE GOVERNOR.

Reduced Price List, Nov. 1, 1879.

EXTRA FOR

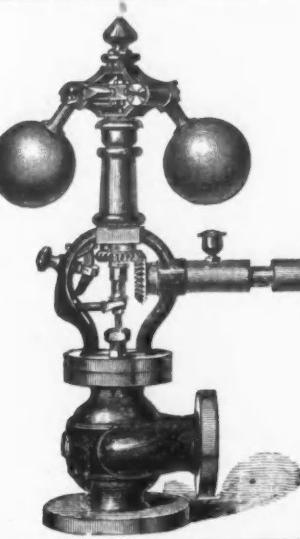
Size of Governor	Black.	Fin.-ished.	Ball and Lever.	Speed-er.	Auto-matic Safety Check.	Stop Valve.
1/4 in.	\$15.00	\$17.00	\$1.00	2.25	\$.....	\$4.00
1/2 in.	16.00	18.00	2.00	2.25	5.00
1 1/4 in.	18.00	20.00	2.25	2.25	6.00
1 1/2 in.	23.00	27.00	2.50	2.75	7.50	8.00
2 in.	27.00	31.00	2.75	3.25	9.00	10.00
2 1/2 in.	32.00	37.00	3.00	3.50	11.00	12.00
3 in.	36.00	41.00	3.50	4.00	12.00	13.00
3 1/2 in.	40.00	45.00	4.00	4.50	14.00	15.00
4 in.	44.00	50.00	4.25	4.75	16.00	17.00
4 1/2 in.	48.00	54.00	4.50	5.00	18.00	19.00
5 in.	54.00	60.00	5.00	5.50	20.00	21.00
5 1/2 in.	60.00	66.00	5.50	6.00	21.00	22.00
6 in.	66.00	72.00	6.00	6.50	22.00	23.00
7 in.	72.00	78.00	6.50	7.00	23.00	24.00
8 in.	78.00	84.00	7.00	7.50	24.00	25.00
9 in.	84.00	90.00	7.50	8.00	25.00	26.00
10 in.	90.00	96.00	8.00	8.50	26.00	27.00

TO ALL WHO USE STEAM POWER.—We will put our Governor on any engine, and warrant it to prove superior to all others, and to do all we claim for it. If, after a fair trial, it does not, we will take it off at our own expense. No charge for boxing. Manufactured by

M. C. SMYLINE,

Office, 139 N. Third St., Philadelphia, Pa., U. S. A.

Works, Bethlehem, Pa., U. S. A.



Issues Policies of Insurance after a careful inspection of the Boilers.

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery.

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS.

Full information concerning the plan of the Company's operations can be obtained at the

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or at any Agency.

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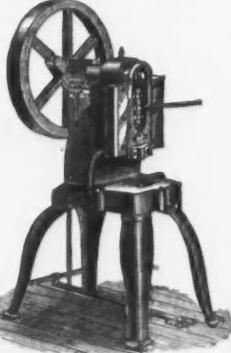
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A. H. MERRIMAN,
Patent Power
PUNCHING
PRESSES.WEST MERIDEN,
CONNECTICUT.

Judges' Report.—He exhibits a power press, or punch, which is a well-made, substantial machine, and contains several features of marked originality, which materially augment its durability and efficiency.



ASTONISHING POWER in PUNCHING PRESSES.

Punching, by foot, 3-4 hole in 5-16
iron 6 inches from edge.Smaller sizes punch, by foot, 3-8 x
1-4, and 1 inch by 1-8, as rapidly as
by power presses, at one-half the cost.Our largest hand machines punch
1 inch hole in 3-8 iron, and shear
bar 3-4 x 2 inches at a cut, any length,
one man at the lever.Highest prize, *The Grand Medal of Progress*, has just been awarded us at the American Institute Exhibition.All our presses can be run by steam
power.PEERLESS PUNCH and SHEAR CO.,
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MANUFACTURERS OF

BOILERS & ENGINES, ALL SIZES.

1-HORSE ENGINE AND BOILER, \$150. 2-HORSE, \$175. 3-HORSE, \$200. 4-HORSE,
\$250. 5-HORSE, \$275. 6-HORSE, \$300. 8-HORSE, \$425.

WARRANTED THE BEST. SEND FOR CIRCULAR.



Independent 4-Jawed Chucks, from 6 in. to 24 in. in diameter. Common Lever Scroll

Chucks, from 3 in. to 24 in. Patent Geared Chucks, from 3 in. to 12 in. Common Geared,

from 2 in. to 12 in. A large variety of Chucks for Amateurs' Foot Lathes. Drill Chucks

for all kinds of machines and purposes. Patent Geared Chucks for Hollow Spindle Cut-

ting-off Machines. Bench and portable Centering Chucks, and special chucks made to

order. Satisfaction guaranteed. All of the above are from new patterns, with every

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Chucks, from 3 in. to 24 in. Patent Geared Chucks, from 3 in. to 12 in. Common Geared,

from 2 in. to 12 in. A large variety of Chucks for Amateurs' Foot Lathes. Drill Chucks

for all kinds of machines and purposes. Patent Geared Chucks for Hollow Spindle Cut-

ting-off Machines. Bench and portable Centering Chucks, and special chucks made to

order. Satisfaction guaranteed. All of the above are from new patterns, with every

improvement a long experience can suggest. Send for price list.

Independent 4-Jawed Chucks, from 6 in. to 24 in. in diameter. Common Lever Scroll

Chucks, from 3 in. to 24 in. Patent Geared Chucks, from 3 in. to 12 in. Common Geared,

from 2 in. to 12 in. A large variety of Chucks for Amateurs' Foot Lathes. Drill Chucks

for all kinds of machines and purposes. Patent Geared Chucks for Hollow Spindle Cut-

ting-off Machines. Bench and portable Centering Chucks, and special chucks made to

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Chucks, from 3 in. to 24 in. Patent Geared Chucks, from 3 in. to 12 in. Common Geared,

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for all kinds of machines and purposes. Patent Geared Chucks for Hollow Spindle Cut-

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improvement a long experience can suggest. Send for price list.

Independent 4-Jawed Chucks, from 6 in. to 24 in. in diameter. Common Lever Scroll

Chucks, from 3 in. to 24 in. Patent Geared Chucks, from 3 in. to 12 in. Common Geared,

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Independent 4-Jawed Chucks, from 6 in. to 24 in. in diameter. Common Lever Scroll

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ting-off Machines. Bench and portable Centering Chucks, and special chucks made to

order. Satisfaction guaranteed. All of the above are from new patterns, with every

TUBAL SMELTING WORKS.

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,
MANUFACTURER OF

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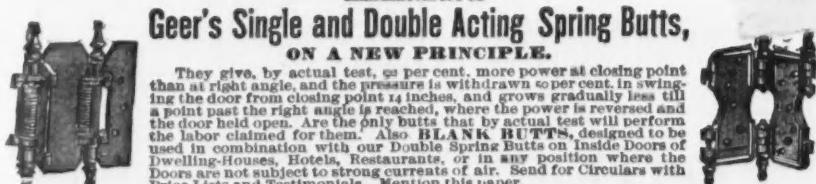
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